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## STREET PAVING

**Bituminous Pavements the Best—A Suggested Combine of Cities to Reduce Price of Asphalt  
—Some Important Principles Considered**

*By B. F. Fendall \**

So much has been written of late years concerning street paving, that it is difficult to discuss the subject and avoid a tiresome repetition of facts already well known to those who have given the question study. It is with great diffidence, therefore, that I approach the task, knowing full well how little I can tell that is new and fearing that I may weary with twice told tales.

To write the history of highway construction would be almost equivalent to writing the history of civilization; the two are co-eval, and, to a certain extent, dependent the one upon the other. We have all heard of the great roads built by the Romans, and the excavations about Babylon and in Egypt. These show us that before any history was written, mankind had learned the art of street paving and road making. It is not necessary here to discuss these ancient roads. While they are most interesting to the archaeologist, they have little value to the engineer of to-day in solving the problems before him.

About the only element that these ancient roads possessed which commends itself to us is their durability. The Appian way was said to have been in good repair eight hundred years after it was built. They answered well the purposes for which they were constructed,

but would not answer the requirements of modern civilization.

### QUALITIES OF PAVEMENT

All agree that a street pavement should possess certain qualities. Byrne, in his "Treatise on Highway Construction" recites them as follows:

- (1) It should be impervious; (2) It should afford good foothold for horses; (3) It should be hard and durable, so as to resist wear and disintegration; (4) It should be adapted to every grade; (5) It should suit every class of traffic; (6) It should offer the minimum resistance to traction; (7) It should be noiseless; (8) It should yield neither dust nor mud; (9) It should be easily cleaned; (10) It should be cheap.

These are the qualities of the perfect pavement, and which of the many pavements now in use approaches most closely to the ideal, it is difficult to decide.

In Baltimore, we have made experiments with nearly all of the various

pavements in use during the past century with varying success, and a short statement of the good and bad qualities of each, as we see them, may be of interest.

Our first paving was done about the time of the Revolution, and was what is known as cobble-stone. Of this class of paving we still have a large amount. It has but few of the qualities of a good pavement, and is hardly worth considering, as it is in no sense



ASPHALT PAVEMENT—SIXTH AVENUE, NEW YORK

\* City Engineer of Baltimore, who read this paper before the sixth annual meeting of the League of American Municipalities, held at Grand Rapids, Mich., August 27-29, 1902.

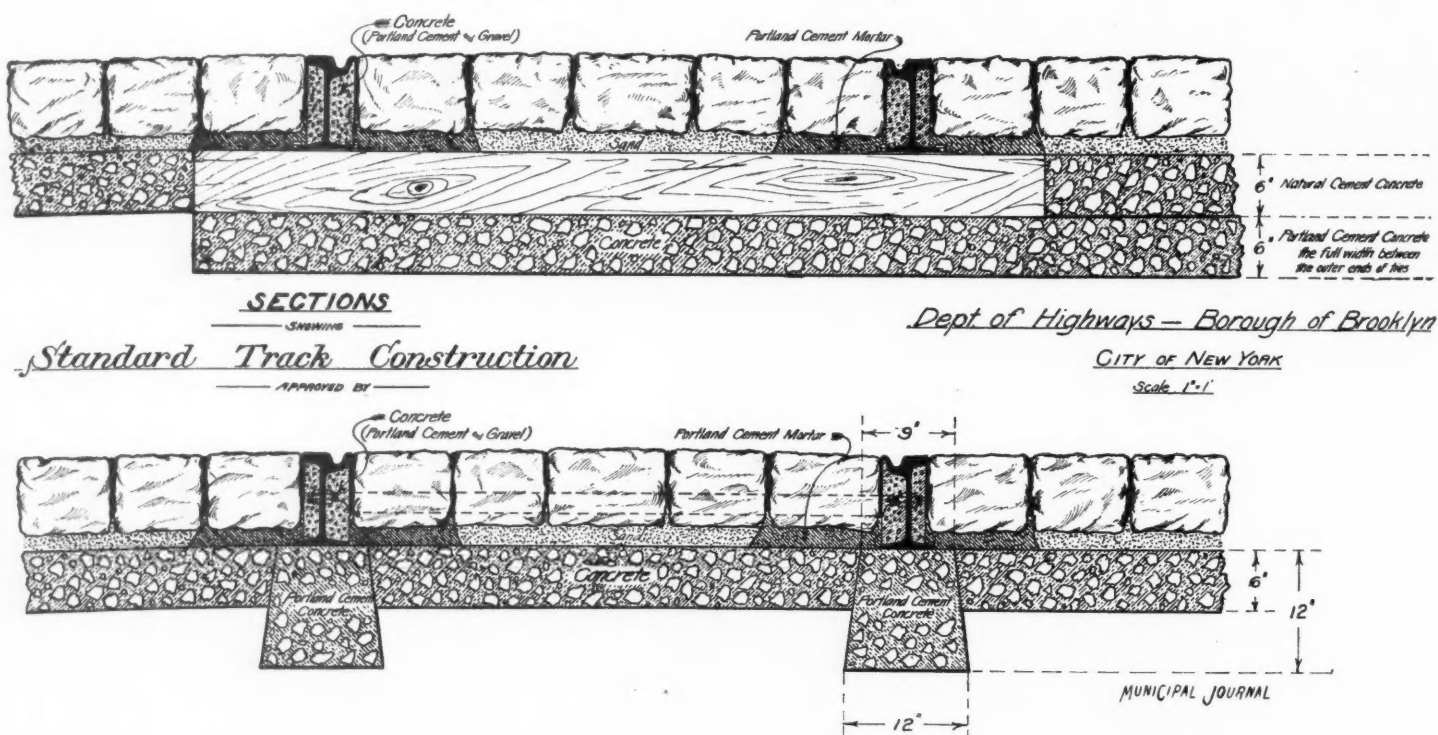
suitable for the requirements of the times. The only thing to be said in its favor, is that it is cheap, as to first cost, and affords good foothold for horses. Next to the cobble comes the granite or Belgian block. In the business sections of the city, where the traffic is heavy, this pavement is satisfactory. Where the joints are poured with coal tar it is impervious. When first laid it affords a good foothold for horses, but it will wear smooth under heavy traffic. It is durable. The blocks when worn badly may be relaid bottom side up and thus make practically a new pavement. It is rough for carriages and noisy. Good granite is found near the city, and it is cheap, costing about two dollars per square yard, laid on sand. The ordinary cost of re-laying is about thirty-five cents per square yard. The cost per yard, per year, for repairs has not been determined, for the reason that the pavement has invariably been disturbed for the various subway work before repairs were necessary.

#### THE USE OF BRICK IN BALTIMORE

Vitrified brick has been tried, both the fire-clay and the shale. Which is the better has not been ascertained. Generally the fire-clay appears to be less dense, not so thoroughly vitrified, but

constructed, has all the good qualities of sheet asphalt, with the addition of being less slippery, and less expensive to repair. Trinidad Lake and Alcatraz sheet asphalt have both been used. Viewing sheet asphalt simply as a pavement, it is peerless. The objections to it are high price, uncertainty about prompt repairs, together with the cost thereof, and it is slippery under certain conditions, especially on grades over 3 per cent. If there was any competition among contractors bidding on this class of work, or if our cities owned their own plants, and could purchase asphalts at a fair figure, doing the work of paving and repairing themselves, then sheet asphalt would be the ideal pavement, notwithstanding the occasional slippery condition.

The cost of sheet asphalt has varied with us from one dollar and fifty-two cents per yard to three dollars and fifty cents per yard. The price of one dollar and fifty-two cents per yard was the bid of the Alcatraz Company, prior to its absorption by the trust. The pavement laid by this company is one of the best we have. It was laid in 1898; it is under heavy traffic, and is to all appearances as good to-day as when first laid. It is guaranteed for five years, and



tougher than the shale brick. In laying brick pavements, a concrete foundation with a sand cushion is used, and the joints are grouted with Portland cement and sand.

In grouting, the mixture is poured twice; in the first pouring the joint is filled about half full, most of the sand settling to the bottom before the cement sets; then, with the second pouring, the sand settles in like manner to about the middle of the block, where it is held by the partly set cement of the first pouring. Sand is then swept over the joints, and held by the partly set cement of the last pouring, thus giving a fairly good bearing at three points on the brick bottom, middle and top.

The great trouble experienced with brick is the irregularity of wear, due to varying degrees of hardness, the rounding of the edges at the joints, and the resulting roughness of surface. While not so noisy as Belgian block, it is by no means free from noise. Owing to the fact that no vitrified brick are manufactured near Baltimore, the long railroad haul adds greatly to the cost, hence the pavement is not so cheap as in the territory west of the Alleghenys.

#### SHEET AND BLOCK ASPHALT

The Asphalt block has been used to some extent; about ten miles of the streets being thus paved. These blocks have been satisfactory in the past, and improvements in manufacturing, lately introduced, will undoubtedly decrease the cost of production, and at the same time produce a more durable block. The pavement when properly

so far, the contractor has not been called upon to make repairs, none being required.

A small piece of wooden block pavement was laid about one year ago, as an experiment, and a contract has just been let for paving about one thousand square yards with the same material. The blocks used are long leaf Southern pine 4x4x8, treated by what is known as the creo-resinate process, and laid on a concrete bed with a sand cushion, joints filled with clean, dry, sharp sand. The claim is made by the Creo-Resinate Company that their process prolongs the life of the block indefinitely by preventing decay.

The treatment the blocks receive is, briefly, as follows: The blocks are heated in an air tight cylinder, without pressure, to drive out moisture, then the temperature is gradually raised and pressure applied; temperature and pressure reduced and vacuum applied until about twenty-six inches is reached, and while under vacuum the creo-resinate mixture is introduced at a temperature of 200 degrees and hydraulic pressure of two hundred pounds per square inch applied, and continued until the blocks take up about twenty-two pounds of the liquid per cubic foot.

The liquid is then run off, the blocks are placed in another cylinder and milk of lime at a temperature of 150° is turned on under a pressure of two hundred pounds for about three-quarters of an hour.

The pavement so far is all that can be desired,—smooth, noise-



less, clean and pleasing to the eye. Whether it will last as long as is claimed remains to be proved.

#### WILL LAY BITUMINOUS MACADAM

The Warren bituminous macadam, or bitulithic pavement, we have not used, but hope to try in the near future. The inventor, Mr. Warren, has explained to me very fully his theory and practice, and I believe he has one of the best pavements now in use. Prof. Dow, inspector of asphalts, and paving materials for the United States Government in Washington, D. C., has said that, "Mr. Warren's pavement had more good qualities than any pavement he had ever seen." This is very high praise from a very high authority.



LAYING BRICK PAVEMENT IN OMAHA

Having thus briefly outlined our experience and practice in Baltimore with improved pavements, I desire to invite your attention to certain facts in connection with modern pavements, which have not been given the prominence their great importance demands. We all know that improved pavements are very costly, but some do not realize the great and material benefit we derive from them in the matter of better sanitation. There should be no questions about expense where it can be shown that a certain measure materially lowers the death rate. Now good paving does lower the death rate. You can thoroughly clean an asphalt pavement, but you cannot clean either Belgian block or cobble. The mud in the joints of stone pavements is foul, offensive and filled with germs. When the mud dries and becomes dust, it is blown about by wind and breathed into our nostrils and throats, and along with the dust we take in the germs. This sort of thing is most surely a disease breeder. The committee of the Society of Arts of London, in a report to the Society, says: "In urban districts, which have been well drained with proper self cleansing sewers and freed from emanations from them, fever has been found to lurk in those quarters where the surface paving and surface cleaning are bad." On the other hand, the extension of impermeable pavements alone, other conditions as to drainage, et cetera, remaining the same, has been attended with a marked reduction of malarious diseases."

#### SANITARY CONSIDERATIONS

Tillson, in his "Street Pavements and Paving Materials," makes the statement that, "At the time of the cholera in London in 1848, it being impossible to clean the cobble paved streets, the Board of Health covered the surface with three inches of clean earth." The same high authority states that in New York in 1892 the number of deaths was 44,329; in 1899 there were 39,822, a decrease of 4,507, despite the large increase in population. This very remarkable condition was largely accounted for by the laying of asphalt pavements on the east side in the tenement districts. Granting these statements to be facts, they are powerful arguments in favor of spending money for smooth pavements.

Here we have the statements, on good authority, that a section of London was well sewered but not well paved and fever prevailed;

another section was well paved but not sewered and fevers disappeared. New York laid smooth pavements, the death rate dropped ten per cent., while the population greatly increased. The cobble stone streets of London had to be covered with earth to prevent the spread of an epidemic, it having been found impossible to clean them. Such illustrations and examples might be multiplied indefinitely. Those recited are sufficient to show that smooth pavements, well cared for, mean health. The health of a community cannot be measured by a money value. Better mortgage the home for good pavements and health than mortgage it to pay the doctor and the undertaker.

#### TRACTION VALUES

Consider the cost of transportation with horses and wagons over rough stone pavements, or poor macadam, as compared with good asphalt. Byrne gives the relative cost of hauling one ton one mile over different pavements as follows: Asphalt 2.7; stone, ordinary condition, 12 cents; stone covered with mud, 21.3; macadam, from 12 to 26 cents; compact gravel 12.8. The average cost per ton per mile in most of our cities will probably be 12 cents or more. On this basis, with good asphalt pavements, we would save, in actual money, ten cents on every ton hauled one mile, which would amount to a large sum in a year. Estimating on the tonnage of the railways of this country, which amounts to about 700,000,000 of tons per annum, and assuming that each one of these tons is hauled one mile over bad streets by wagons at some time before it reaches its final destination in the hands of the consumer, we can save ten cents on each ton thus hauled, thus saving per annum, \$70,000,000, which, capitalized at 3½ per cent., would make the enormous sum of two billions of dollars. These figures, as a matter of course, are simply assumptions, no exact data being available, but I believe they are somewhere near the truth.

#### COMBINE TO REDUCE PRICE OF ASPHALT

I desire to call attention to the ever varying price of sheet asphalt paving, and suggest that this League consider the propriety of fixing a standard price for such paving, based upon certain unit values for the materials used in its construction.

The President might appoint a special committee to consider and report upon the question, or it might be referred to some standing committee, and when the League has reached a conclusion, let the



MAKING CONCRETE BASE FOR BRICK PAVEMENT, OMAHA

various cities throughout the country be advised as to this conclusion and requested to consider the advisability of co-operation and of fixing by ordinance the maximum price for sheet asphalt paving in each city. I do not know that such a plan is practicable, but I do know that there is great need for some check on the asphalt monopoly. When Washington, D. C., is paying \$1.56 for sheet asphalt, and Baltimore is paying fifty per cent. more, and other cities one hundred per cent. more, it appears to be desirable for our cities to combine to meet the asphalt combine,

# MUNICIPAL CONTRACT SYSTEM

**Opposed by Politicians—The Baltimore System Described—Reasons Favoring the Method—Some of the Results**

*By Thomas G. Hayes \**

THE contract system in municipal government is a theme of first importance to those interested in a wise and economical administration of the government of our large cities. This system, so long as present conditions exist, will be always opposed by a certain class known as the professional politicians, and there will also always be two conditions which must be observed and insisted upon whenever municipalities adopt this system, and these are, first, absolute honesty in awarding the contracts, and, secondly, municipal supervision must be retained and enforced over the performance of the contract.

## THE ONLY ECONOMICAL WAY OF DOING CITY BUSINESS

The contract system will always be opposed by those who want the offices and desire all municipal employees to be political appointees. This demand will continue until politics are divorced from municipal government, and it requires a firm and courageous Mayor to resist this demand from his party leaders.

Honesty in awarding contracts is absolutely essential for a successful working of the contract system in municipal government. If contracts are to be awarded to the favorites who may have the influence of some mighty person with the administration then all the evils which flow in the wake of a corrupt administration will be experienced. The system for awarding all contracts over \$500 adopted and faithfully followed in the Charter of Baltimore, in my opinion, is the best offered by the organic act of any municipality in our country. That system is as follows: The charter prescribes that all such contracts for either work or supplies over \$500 needed by the city shall be awarded to the lowest responsible bidder by a Board of Awards. This

\* Mayor of Baltimore, who read this paper before the sixth annual session of the League of American Municipalities, held at Grand Rapids, Mich., August 27-29, 1902.

Board is composed of the Mayor, City Comptroller, President of the Second Branch City Council, City Register and City Solicitor. The first three are elected by the people of the city, the fourth named is elected by a joint vote of the two branches of the City Council, and the last named is the head of the Law Department, and is appointed by the Mayor. The personnel of this Board is most admirable, and ensures men who will ever have the public interest and welfare at heart. Indeed, it may be said a Board that can be neither bought nor bossed,

## HOW CONTRACTS ARE AWARDED IN BALTIMORE

This system takes from the municipal department needing the work and supplies the awarding of the contract. The department prepares the specifications and submits them to the Board of Awards, and after review, and correction if necessary, the Board of Awards approves them, and, through the daily press, requests bids on these specifications, and at the appointed time awards the contract to the lowest responsible bidder.

It is wise thus to remove from the department needing the work or supplies the awarding of the contract. The temptation to the department heads to make corrupt dickers, or deals, with the bidders is removed, and the responsibility of fair dealing with all bidders is placed in a board composed of the men holding the most responsible places in the city government. I fearlessly and boldly here assert that since this system has been in operation in Baltimore that no bidder offering work or supplies to this city has had to seek outside influence, pay any "rake-off," or resort to other corrupt means to obtain a contract from Baltimore city. Ask the furnishers of municipal supplies or work who are present at this convention how they manage to get contracts in Baltimore and every one of them will tell you it is by



SHOWING CONSTRUCTION OF A SPECIAL THREE-INCH ASPHALT BLOCK PAVEMENT IN TOLEDO, BY THE LAKE ERIE ASPHALT BLOCK COMPANY  
(For description of this pavement see page 134.)



offering goods of standard quality and at the lowest cash market price.

I have said that municipal supervision must be retained over the fulfillment of the contract by the bidder. This is necessary to ensure a faithful compliance by the contractor with the requirements of the specifications, or, in other words, to ensure a faithful compliance by the contractor with the terms of his contract.

With honesty in awarding contracts, and municipal supervision retained, is the contract system desirable in municipal government? My experience as Mayor of a city of 600,000 population, on the Atlantic sea-board, leads me unhesitatingly to answer this question, Yes.

employer always gets better service from his employees than does the government. Employees of the government, as a rule, are less impressed with their obligation to give faithful service than are those of the private employer. It is very hard for the municipal employee not to feel that a part of his obligation as to service has been rendered to the party to which he belongs, and which has aided him in obtaining the place. There could not be a greater drawback to faithful service than for the employee to feel and believe that a half service only is required of him. This is invariably the case when the employees of a city, on any work, are political appointees. The tenure of employment of the employees of a private contractor is known to be only so long as



COATING FOUNDATION OF NORWICH, N. Y., BITUMINOUS MACADAM PAVEMENT WITH BITUMINOUS CEMENT—  
LAID BY THE WARREN BROTHERS COMPANY, OF BOSTON

#### REASONS FOR APPROVING THE SYSTEM

It may be of interest to the members of the League to know my reasons for so heartily approving the contract system in municipal government. First, it helps a mayor to run his city government on business principles; in other words, it is an important step towards eliminating politics from municipal government. It is the destruction of the spoils system in city government. Under the contract system the employees who do the city work have a private employer instead of being the political henchmen of some political boss. This is a result of untold advantage. The trend of the efforts of municipal workers and thinkers is to divorce municipal government from politics, and the contract system is a helping agency towards the consummation of this desired result. Again, the contract system gives better service. The reason for this improvement of service is that the private

faithful service is rendered, while if the employee be political the tenure is known not to depend upon faithful service but upon the will and wish of some political boss.

#### SOME OF ITS RESULTS

There is still another advantage of the contract system; it is the saving of the taxpayers' money if the contracts are awarded after fair and honest competition to the lowest responsible bidder. Permit me to give, in confirmation of this last statement, my experience with the contract system, which was inaugurated by myself as Mayor of Baltimore. There are used in Baltimore 1,500 electric lights. There is but one electric light company in that city. Prior to the present contract system this company charged Baltimore \$127.75 per light, per annum. Specifications were prepared and advertisements were inserted asking for bids for lighting the city for three years with lights

of equal candle power to the then existing electric lights, not excluding electric lights. The result was that the same electric company which was receiving \$127.75 per light, per annum, bid \$99.92 per light, per annum, and the contract was awarded to this company for three years, thus saving to the taxpayers the sum of \$125,235. The city of Baltimore, in a similar manner, contracted for the service of lighting 6,200 gas lights. It cost the city to light these lights \$23.84 per light, per annum. The contract was given to the lowest bidder, who agreed

garbage to cost several hundred thousand dollars. The contract system in these three items saved to the taxpayers the sum of \$483,313, nearly one-half million of dollars. It must be remembered that the contracting out of this municipal work in no manner deteriorates the character of the service, but decidedly improves it.

Many more such instances might be given of the saving by the contract system, such as a reduction in the cost of fire hose from \$1.00 to 65 cents per foot, the quality of the hose for 65 cents being as good as



ROLLING AND FINISHING BITUMINOUS MACADAM PAVEMENT, NORWICH, N. Y.—

LAI D BY THE WARREN BROTHERS COMPANY, OF BOSTON

to give the same service for \$14.15 per light, per annum. The saving to the taxpayers by this contract was \$60,078. The city of Baltimore paid for the removal of garbage, when done by its own employees, \$177,800 per annum. A contract was entered into by the city for this work, and it now costs the city \$148,000 per annum. This contract is to run ten years, and gives a saving of \$29,800 per year, and for the ten years there will be saved to the taxpayers the sum of \$298,000. The garbage contractor is obligated to remove the garbage in the most improved sanitary carts, and to construct a plant for burning the

that of the \$1.00 hose; a reduction in the cost of coal, in some cases 50 per cent., and many more similar reductions might be given if time permitted.

There may be certain classes of municipal service which it would not be wise to contract out, but these are exceptions, the general rule being to contract out whenever the service will permit.

This saving has helped greatly to reduce the taxes, and the gratitude of the taxpayers of my city to the administration which has lightened their burdens is most pleasing and welcome.





# CIVIC TAXATION AND TRANSPORTATION

**The Origin of the Right to Tax—The Power Grossly Abused—Some of the Evils—A Reform Necessary**

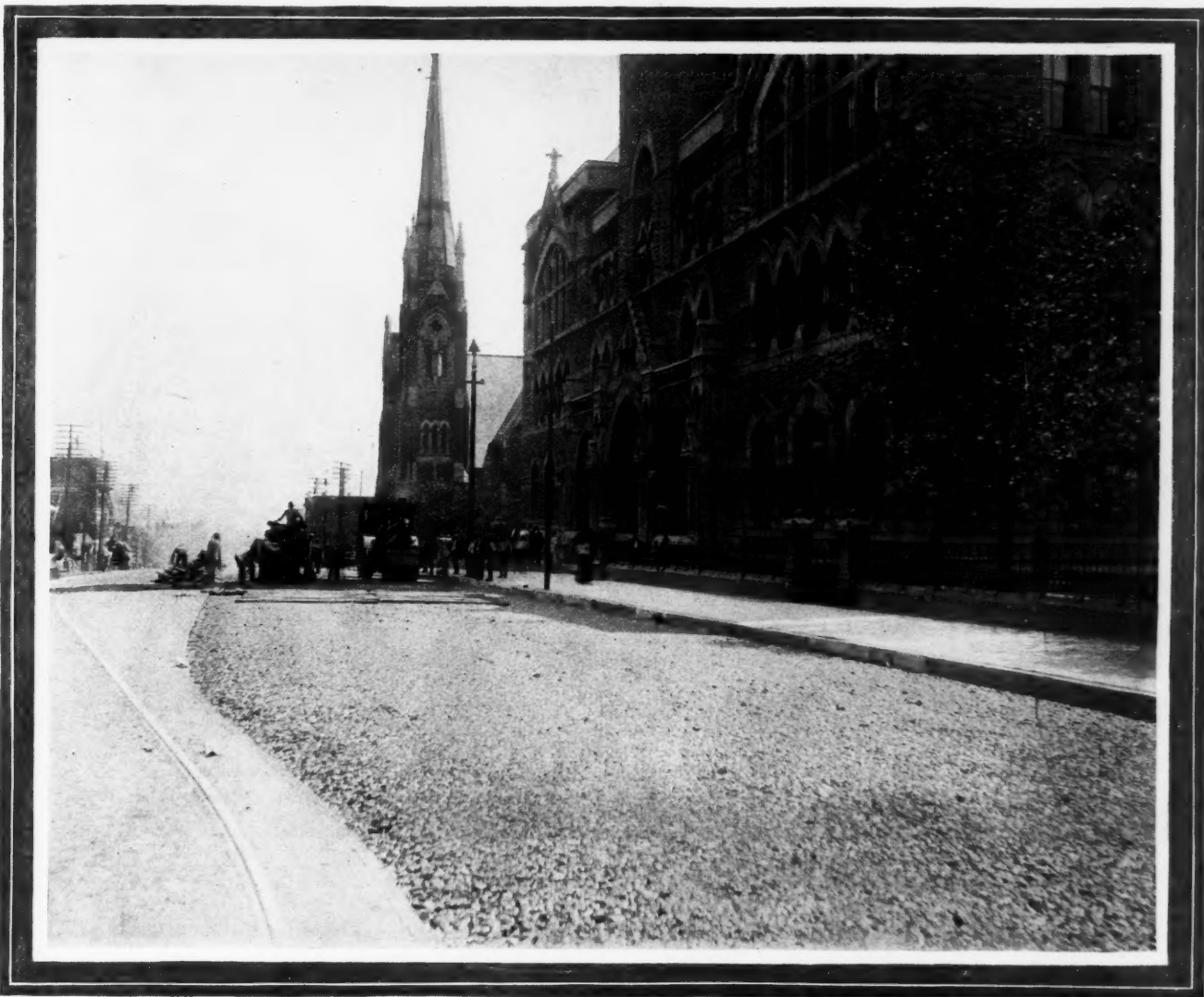
*By J. M. Head\**

It is hardly to be expected that a paper suitable for an occasion of this kind, could do more than suggest a line of thought which others may follow to some practical conclusion. And in seeking to direct the minds of the members of this League to the subjects of "Taxation and Transportation in their relation to Municipal Government," I shall endeavor to show their intimate relation to each other, and their importance in relation to all governments.

If, as has been said by the Supreme Court of the United States, "the power to tax, is the power to destroy," it may also be added with equal truth, that the power to tax affords an easy mode of life to the person in whose favor it is exercised. It matters not how this power is exercised, whether directly through the instrumentalities of

hend, how it was possible ever to have induced the representatives of the people in a republican form of government to have surrendered these essential functions of government,—the power to tax and the duty to provide the best and cheapest mode of transportation,—and to have turned them over to private individuals and quasi-public corporations to be exercised, not for the public good, but to satisfy private greed. Yet, such is the fact, and we now stand almost paralyzed at the very suggestion of requiring the government to resume its necessary functions, and wrest from these individuals, a power to which they were never legally entitled.

It must not be forgotten that originally, neither governments nor individuals possessed the power to tax. Governments relied for their



FOUNDATION PREPARED FOR BITUMINOUS MACADAM WEARING SURFACE—LAID BY WARREN BROTHERS COMPANY, AT NASHVILLE, TENN.

government for the public good, or indirectly through tariff rates or transportation charges, it still possesses both "the power to destroy," and "the power to make alive"—through great riches.

## CERTAIN GOVERNMENTAL FUNCTIONS SURRENDERED

It is difficult to believe, and in fact, almost impossible to compre-

support upon voluntary service and the spoils of conquest for their continued existence, and even as late as the time of Cicero, that great orator and statesman expressed the fear that the time was not far distant when the government would be forced to resort to the power of taxing its subjects for its support. That time has not only arrived, but the ingenuity of statesmen is being exercised to find additional sources of revenue, and devise more stringent means of enforcing the payment of the taxes levied.

\* Mayor of Nashville, Tenn., who read this paper before the sixth annual session of the League of American Municipalities, held at Grand Rapids, Mich., August 27-29, 1902.

#### THE GOVERNMENT'S POWER TO TAX

This power has now been exercised so long that it is regarded as one of the original powers of government, important and essential to its existence, but never until within a comparatively recent period was it ever imagined that the government not only possessed the power to tax, but that it also possessed the power to delegating the right to use this power to quasi-public corporations, to be used for private ends, and to satisfy private greed.

This usurpation by private individuals of the power of taxation, is to my mind, illogical, unjust and illegal, and must be restored to and exercised by the government alone for public purposes and the general welfare. And when this is done, the taxes levied by the government will be found comparatively light.

tions. The simple fact of densely populated communities, renders police and fire protection a necessity, water, sewer and light facilities essential to preserve the public health and convenience, and rapid transportation, one of the prime conditions of a city's development.

And yet, in every city in the union some, if not all of these governmental functions, have been given to private individuals, coupled with the power to tax the community for the privilege of enjoying the very benefits which city government was intended to furnish. In other words, these benefits which should be furnished to the public at actual cost, are used as a means of taxing the public, for not only the cost of their maintenance, but in addition to this, a sum sufficient to pay interest and dividends upon stocks and bonds watered many times over the actual cost of providing the service paid for. And



THE FINISHED WARREN'S BITUMINOUS MACADAM PAVEMENT, LAID AT NASHVILLE, TENN.

There is scarcely a city in the United States to-day, that is not taxing its citizens almost up to the limit of endurance, and many of them are trying new and doubtful methods of raising the necessary revenue to meet the ever increasing demands of modern city government. That this is due to the fact that nearly all city governments have been grossly, not to say corruptly, mismanaged in the past, and large debts piled upon them, the interest upon which must be met, is undoubtedly true; but it is also true that the public does not yet seem to fully realize that city government is largely a business proposition, and compel its officials to adopt business methods in its management.

#### THE PURPOSE OF CIVIC GOVERNMENT

The very purpose for which city government is established, is to enable the inhabitants of a local community to provide themselves with the conveniences and necessities incident to their local condi-

this tax, instead of being used for the public good, is paid into the private coffers of individuals. Is it to be wondered at, when the city has given away these valuable sources of revenue, to private individuals, that the necessary expenses of city government must be provided for by increased taxation and multiplied sources of revenue.

#### EXTENDED TO PRIVATE CORPORATIONS

And, yet, with such a power as this outstanding in the hands of private individuals, with power to levy a tax upon every pound of freight that is shipped, and every passenger that rides, we some times so far forget ourselves on 4th of July occasions, and when candidates for office, as to boast of our free government, and the preservation of our time-honored constitutional liberties, all of which are idle dreams, until this power of taxation is wrested from the hands of private individuals, and restored to the government, where it belongs. The municipality must resume the exercise of its proper func-



tions of furnishing to the people the best and cheapest government, the most efficient police and fire protection, and the latest and most efficient method of transportation and communication with each other, at as near the actual cost of service as it is possible to ascertain.

It is only through the exercise of these powers, first through municipal governments, that the state and federal government, can be made to realize and appreciate the duties which they owe to the public.

The growth of public interest in municipal government during the past ten years has extended to every subject affecting in any way, the development of the city. And there are certainly no two questions which affect more vitally the growth of the city than the transportation of its population and its products, and the taxation of its property and its inhabitants.

#### THE GENERAL TRANSPORTATION PROBLEM

That the transportation problem is one more far-reaching in its effect that its mere influence upon the growth or dwarfing of municipal development is concerned does not render its influence in this respect any the less important. In fact, no one who has studied the question, can fail to realize that its proper settlement is the great question of the future. All trusts, combines and monopolies must depend at last upon their ability to influence transportation for their continued existence, as controlling factors in the development of our complex civilization.

When a political organization was started, some ten years ago, which had for one of its cardinal doctrines, the governmental ownership of railroads, telegraphs and telephones, it was made the butt of ridicule, and its doctrines were treated by many with contempt. In the light of subsequent events, and more recent developments along the line of consolidation, co-operation, traffic agreements and community of interests, can anyone give an intelligent reason why if these gigantic combinations of capital can be successfully operated and controlled for personal profit, it can not be done by government, for the general public good.

The fact that the governments of the old world have successfully managed many of these so-called natural monopolies, can not be pushed aside with the simple statement that their form of government is different from ours, more arbitrary in its management, and, therefore, better suited for the ownership of business enterprises. If monarchical forms of government have been quicker to perceive the advantages and ultimate necessity for the ownership and operation of all natural monopolies, by and for the account of the general public, it is only because the ultimate source of power in these governments, does not require the tedious process of educating public sentiment, which is so essential to the success of any reform under our system of government. The advantage, however, with us is that when public sentiment is once formed, no power can long stand in the way of it, or change its decrees.

But, whatever may be thought of this proposition now, the time can not be far distant when the consolidation of all transportation facilities, which are now being made, will be so far completed, and its power so great, that the government must of necessity own and control the consolidated properties, or the pretense of popular government given up as a failure.

#### STREET RAILWAY TRAFFIC

The cities that have been built up by this power of transportation, their commerce been made to bloom and blossom as the rose, and their population to double and treble by the same magic touch, but mark the contrast with those which have been blighted and withered because of the lack of such a stimulant. This power to influence and control the destinies of cities, to direct and locate population, and to turn the commerce of the country into whatsoever channel it may wish is a power that must be exercised either for the general public good, or it must be destroyed, if popular free government is to remain anything more than a name.

I have thus far spoken of transportation in its broader sense, as affecting the relation of the city to the outside world. There is also another character of transportation which wields almost as great an influence over the destiny of the city as that just spoken of, and that is its local or street car facilities for handling and accommodating

its purely local business. Rapid transit at short intervals, from one section of the city to another, is as essential to its growth and development as satisfactory communication upon reasonable terms with the outside world. In fact, it would be difficult to say which of these characters of transportation wield the greater influence in building a city.

There can now be no doubt but that the Federal, State and Municipal Governments all made serious mistakes when, for any cause, they abandoned one of the first and highest duties of government, and that is, to provide its citizens with suitable, appropriate and convenient modes of transportation and communication, whether it be by public roads, turnpikes, streets, street-cars, electric or steam railroads, telegraph, telephone, or a free city and rural delivery mail service. Any one, or all of these services are purely governmental functions, and whenever abandoned by the government, or turned over to private individuals, or corporations to perform, that government has fallen short in the discharge of the duty for which it was created. All of these duties come under the general head of the duty of the government to provide its citizens with the best and cheapest means of transportation and communication which can be provided under existing conditions, and the highest state of the art.

#### DEPARTURE FROM FIRST PRINCIPLES

When this country was first settled, roads or public highways between contiguous forts, so essential for their mutual defense, were recognized as a public necessity, and were provided and kept up by an assessed tax of so many days' labor upon each man between certain ages. And, strange as it may appear, this method of attempting to keep up the public highways is still in force in Tennessee and several other states. This principle, if carried to its logical conclusion, necessarily means the governmental ownership and control of every means and method of transportation and communication, which has yet been devised, for the convenience and accommodation of mankind. And why the general public has been so slow to realize and comprehend this fact, it is almost impossible to imagine.

This principle induced the legislature to confer upon county courts the power to lay out county roads and look after their general welfare; and to confer upon city councils the duty of opening and closing streets and alleys, and keeping them in repair. This same principle would have made it the duty of the county court to build and own turnpikes, and of cities, to construct and maintain street railroads, when population and conditions demanded it. It would also have made it the duty of State and Federal governments to build and maintain railroads, telegraphs, telephones and free mail delivery as the opportunity and demand for these public conveniences and necessities arose.

#### FATAL MISTAKES MADE

That a fatal mistake was made when some of these governmental functions were turned over to be controlled by private greed, is now apparent to every man who has given the subject serious thought. The magnitude of the mistake, however, has not been made to fully appear, until within the last few years.

The street car service of the cities, and the railroad transportation of the whole country, has recently assumed such gigantic proportions and has shown itself to be so powerful, that nearly all city and state governments, and even the federal government itself, are now almost completely dominated and controlled by this influence.

There is scarcely a city of fifty thousand inhabitants in the Union where all the street cars of the city are not under the control of one corporation, and that corporation controls the city government. There is scarcely a state in the union, where one, or, at most, two railroad systems, do not absolutely control the politics of that state. While the power of the great transcontinental lines over Congress, has been a matter of general comment for the past twenty years.

But, within the past three years, there has arisen a power greater than all these, and that is the practical consolidation of all these great interests under the control of one man, and that man, not a sworn official of the government, but the chosen representative of private greed, as opposed to the public welfare. How long will the public submit to the commercial dictatorship which has already been established, and the political dictatorship which must necessarily follow?

### THE EVILS OF THE PRESENT SYSTEM

The worse feature of the mistake which was made when the several governments, Federal, State and Municipal, abdicated their functions in favor of private individuals, which were organized into quasi-public corporations, in most instances conferred upon these corporations unlimited or perpetual charters, and the courts of the country are now holding that these charter rights are contract obligations which the State and Federal Governments are bound to uphold in all their hideous enormity. That the public, having parted with a portion of its sovereignty, through the ignorance, neglect or corruption of its representatives, is now estopped to reassert these rights and must forever remain subject to the domination and control of the power thus created.

It is also claimed for these corporations that the corporate rights conferred by the state and city, may be mortgaged for any amount, the proceeds of the bonds or the bonds themselves, divided out amongst the stockholders, or paid to corrupt public officials, and that this mortgage will pass, and continue to pass these property rights perpetually, even though the life of the corporation itself were limited. These legal consequences have built up a gigantic transportation combination, which seeks the control of all government and unless

taken in hand, will eventually destroy not only the government which created it, but the very civilization which made its existence possible.

If the municipalities of the country will strike a decisive blow, first, for the inalienable right of local self-government, as to all matters purely local in their nature, and then take away from all individuals or quasi-public corporations, the power to tax for private gain, only allowing this power to be exercised by the government for the public good, then will the municipalities of the twentieth century have done for human liberty the same service that the boroughs of the Middle Ages did when they destroyed the power of the Feudal Barons to rob and plunder at their own sweet will.

In my judgment, government alone has, and should exercise, the power to tax, and whenever that power is exercised for any other than the public good, it is illegal. And whenever the government, whether it be Federal, State or Municipal, undertakes to farm out or give away that power, and confer upon quasi-public corporations the right to levy and collect taxes, through tolls, for the use of the prime necessities for which governments are instituted, it abdicates its original functions, fails in the very purposes for which it was established, and in the language of the Declaration of Independence, "it should be abolished."

## THE CANADIAN MUNICIPAL SITUATION

**Similarity of Interests with United States—Municipal Telephones Advocated—Impositions of Private Corporations—Must Own and Operate All Public Utilities**

*By W. D. Lighthall \**

CANADA is, roughly speaking, about the same size as the United States. It is not, as so frequently pictured, a mere land of ice and snow. That is one of the old school of notions. Modern methods are rapidly proving that it is a country nearly as rich in available resources as the United States itself—rich beyond conception in farming prairies, in available forests, in mines of every kind, from nickel, coal and iron, to the gold of the Yukon. We are in the position in which the American people were seventy years ago,—

"No pent-up Utica confines our powers,—  
A vast, a boundless, continent is ours."

### THE RESOURCES OF CANADA

Western Canada particularly is simply a fertile extension of our own West. You will not, therefore, perhaps be surprised when I make one more statement,—that we are moving fast on the way to becoming another United States. The two countries are much more nearly equal than appears superficially. But since comparisons are odious, I shall go no further than my purpose warrants, knowing that I address a very exceptionally clear-headed assemblage of men and that you will be interested in hearing such a view expressed even while you question it. Let us agree that at least the Canadian people resemble the American to the extent that they have something of a large territory, and some wealth of resources and a future. Incidentally, make no mistake that we own these things, not as a dependency but a nation—an independent nation—belonging to the British Empire by our free will alone.

The next point of family likeness of our people to yours is the identity of their daily life and institutions. From the address delivered last year by my able and popular friend Mayor Arbutnot, of Winnipeg, you are aware that municipal institutions everywhere throughout Canada are established on the same general lines as in the United States. No two peoples in the world are so closely similar. As a whole we are somewhat behind your Northern States, but not greatly. Our population is more rural than yours, and considerably more rural than your Northern States. While President Johnson showed last year that nearly fifty per cent. of Americans live in places over 1,000, about forty per cent. of us live in about the same—that is in what we know as "incorporated places." Of great cities

we have few—Montreal, 375,000, and Toronto, 250,000, are the only ones over 75,000. Still, our civic population is quickly increasing and few cities of America exhibit such growth and prospects of growth as Montreal, Winnipeg, Toronto and Vancouver.

### MUCH TO LEARN FROM UNITED STATES CITIES

We gladly look to your leading civic experiments for many improvements—and these improvements, such as street beautification, disposal of garbage, filtration, park extension, and so forth, we are introducing as fast as we can. On the other hand there are a few things in which a thoughtful American could perhaps learn something from us. For example, the absence of party politics, the permanence of municipal officers, and I think perhaps some points in electoral working. The systematic removal of snow from street railways and sidewalks has also naturally been brought to a high point in some places, and in other lines climatic difficulties have been successfully handled. We are spared nearly all the slum problems, as we have almost no congested districts.

Encroachments by electric companies are the liveliest question with us. Through wily charters, and tricks passed about by the corporation lawyers and trade journals many have passed all limits of legitimate business and obtain power to tear up our streets and erect poles, wires and conduits at will. To the cities it has become almost a fight for existence, and the cry comes from all Provinces for delivery from the yoke. (The complaint doubtless sounds to you like "Home Sweet Home.") Hence, last summer the Union of Canadian Municipalities, a national organization, was formed at Toronto, whose Executive Committee came before the Legislatures and the Dominion Parliament during the winter and commenced a very promising work of legislative reform. The Second Annual Convention opens on the 15th of September next in Montreal. The number of members thus far is eighty, comprising nearly all the principal cities, from Halifax to Victoria. Its work is a little different from the American League, being mainly occupied with legislation. All past delegates are to be made associate members.

Another of our immediate questions is that of the telephone. Heretofore we have had no service to speak of in the Dominion, except the Bell Company, a corporation similar in its methods to the American Bell Company and controlling all long distance connection at high rates. This year we imposed upon them Government regulation of rates and some other points of control. Even the existence of independent telephony is scarcely known among us yet, although

\* Mayor of Westmount, Canada. Mr. Lighthall was a fraternal representative, bringing cordial greetings from the Union of Canadian Municipalities, which was organized last year. Its next meeting will be held at Montreal, September 15, 1902. He delivered this address before the sixth annual session of the League of American Municipalities, held at Grand Rapids, Mich, August 27-29, 1902.



Ottawa, Hamilton, Port Arthur and Port William and some Manitoba places are introducing systems. The Union of Municipalities has, however, obtained the promise of a general Act controlling rates, compelling long service connections and favoring municipal exchanges, and looking towards a cheap national system.

#### WE MUST OWN ALL PUBLIC UTILITIES

This brings up what, to my mind, is the greatest question with which the Canadian people are face to face—Public Ownership—for Municipal Ownership is only part of the larger national question. Seventy years ago your people, like ours, were the owners of a wonderful common heritage of lands, mines and forests. Where is that common heritage to-day? It has been parted with. Yours are far on the way to the land monopolies, the oil monopolies, the coal and copper money system of Europe, and you are realizing that the Golden Age of free land for all is over, that the benign mother America is seeing arise before her a multitude of disinherited children, and that even the liberty of the citizen is becoming contracted by the power of the concentrations of wealth. Many rich men regret this as well as the poor. It is the fault of a bad system of dealing with the public resources.

As a nation we Canadians now stand where you did. We have that wide, ungranted common heritage. It is disappearing as yours did, and I hope to God that we may take your lesson and that of old Europe to heart before it is too late. The palsy that oppresses the European nations—the palsy of a heartless economic system—is creeping gradually over both yours and ours and we must take prompt heed. In our older districts we have even now parted, as you have done, with too much of the heritage of the people; and the means of reacquiring, so far as can be, what is necessary for their use, lies largely with the municipalities. We older communities must defeat the public utility grabbers, the water power grabbers, the park land grabbers, the river front grabbers, the crushing trusts, largely by means of municipal ownership. We have begun like you to try to do this. As a whole, the Public Ownership problem is complicated and difficult,—not to be solved at a stroke by some wild revolution or ignorant panacea. In Canada the Municipal Ownership of water works is general, of

lighting plants is becoming so, the telephone question is moving, parks and libraries are being opened rapidly.

#### MANY PROBLEMS IN COMMON

But, though the redemptive process is slow in the long settled communities, the field is obviously much clearer for the protection of the people in those yet unoccupied regions where wise legislation by the governments before they have granted the common heritage could forestall the threatening evils and endow the municipalities of the future as well as the future generations, with generous reserves of fundamental rights. Perhaps the imposition of such reserves in national grants may turn out but a dream, but with your great American sympathy with freedom of all kinds you will be glad to hear of that dream and the impending efforts to bring it about. "Britons never shall be slaves," and neither will you, the grandsons of Britons and children of the Revolution, ever submit to slavery. Gentlemen, I have an unbounded confidence in the American people and believe them capable of ultimately conquering all the problems and all the difficulties of civilization. I have the same sober confidence in my own people and in the other English-speaking peoples with whom you and we divide the dominion of the world. In the march towards happiness and all development let us step together in spirit, clothed though we may be in the home rule freedom of the various governments of our separate choice.

In explaining to you then the closeness of the similarity between our two nations and their struggles for improvement, I appeal to you to do all in your power to foster good relations between them. At times we hear a few foolish words about "rival nations," "annexation," and so forth. They are futile and unworthy. Let us rather aim to help each other along. Let us have increased knowledge of, and sympathy and fellow-feeling with, each other. It stands to reason that by means of such a friendly spirit there ought to result some day an intimate union of some kind between two peoples so alike, so near, so bent upon the same ideals,—a union voluntary, humanitarian, large,—I trust as large as the entire English-speaking world. Whatever the form, it will receive, quietly if not conspicuously, no small part of its impetus from our intercommunion and sympathy in this vast and vital matter of municipal improvement.

## GAS LEAKAGE IN AMERICAN CITIES

**The Economic and Hygienic Aspects of the Situation—Enormous Annual Leakage—The Consumer Pays for the Waste—How to Remedy the Evil**

*By James C. Bayles, M. E., Ph.D.\**

THAT gas leakage as a municipal problem has attracted so little popular attention and been so completely overlooked by those charged with responsibility for life, health, the safety of property in cities, the conservation of municipal improvements and the public welfare generally, can be explained on no other grounds than that its magnitude and significance as an evil have not been understood. The explanation of this ignorance is found in the astonishing discretion of those connected with the gas industry. No matter what happens, the gas engineer looks the other way and says nothing. If a section of the city is blown up, with appalling fatality, as in the case of the Boston subway; if houses are wrecked and lives destroyed, as more recently in Chicago; if monumental hotels full of people are wrecked and great values destroyed, as in New York, the gas engineer attends strictly to business and keeps his own counsel with the habitual reticence of the clam. He answers no questions, debates no statements, volunteers no explanations, knows nothing even when called to the witness stand, submits to reviling with more than Christian patience, and derives great satisfaction from the knowledge that, as the world makes news very fast, whatever happens to-day, however dreadful, will be an old story to-morrow and by next week will have been forgotten. In all of this he is wise. He dare not tell the truth; and it would not profit him to tell anything else. Silence is incomparably discreet.

#### THE EVIL NOT GENERALLY KNOWN

There are very few American communities in which the facts of

\* New York.

gas leakage in distribution, if known and comprehended, would not create a popular panic, and as the result hasty and ill considered attempts to regulate the evil by municipal ordinance or legislative enactment might be expected, with very little benefit to the public and vast damage to the gas industry. It is, however, an evil which should be studied carefully and thoughtfully by all who are interested in municipal management, to the end that a practicable remedy may be found and its employment required as a condition of the continued use of the enormously valuable franchises which the gas companies enjoy. As the rule, such franchises are given by cities before their value is appreciated, and in the hurry to secure local improvements rights are granted for which those securing them would be glad to pay liberally if they could not make it appear that they are at best only a fair offset to the risks which capital takes in availing itself of them. A franchise is a contract as binding upon the grantor as upon the grantee; but nothing in the way of the most sacred contractual obligation imposes upon a city the patient toleration of a public nuisance involving danger to life and health and a perpetual menace to property. Public policy demands that it be assumed as the essence of every franchise privilege, that it be availed of without creating conditions which are intolerable. Very few gas companies are enjoying their franchises without creating and maintaining a gigantic public nuisance.

The shrewd and politic gas engineer, if forced to discuss the problems of his business, will admit that there is some leakage in distribution, but very much less than is generally supposed. He will tell you that what the public erroneously supposes to be leakage is "gas

unaccounted for"—a total made up of sundry items which he proceeds to account for very plausibly. The first of these is shrinkage, due to the fact that the gas is measured hot at the station meter and sold at the temperature of the ground to consumers, the difference in volume constituting the principal part of the unaccounted-for gas. Condensation is another,—the measured vapor of water in the gas condensing as it cools and causing shrinkage. Other items are consumption at street lamps in excess of estimate, slow meters which pass more gas than they measure, gas stolen through by-passes introduced between mains and meters, exosmose and finally "some leakage"—perhaps two or three per cent. of the gas unaccounted for. This is all a very clever fiction. The gas superintendent who could not account within a very narrow margin for all the gas lost sight of in the ways described, would be likely to lose his job very quickly. Shrinkage is allowed for by charging production only with what the reading of the stationmeter shows when corrected to a standard temperature and barometric pressure—usually 60 thermometer and 30 barometer. A gas superintendent who allowed himself to be charged with gas measured at, say, 80°F. and debiting himself with heat units, would be properly described in the language of Mark Twain, as "a good many different kinds of an ass." Equally would this be true if he left himself chargeable with leakage representing differences between apparent production and actual consumption, which from his



EFFECT OF GAS LEAKAGE ON ASPHALT PAVEMENT, BROOKLYN, N. Y.

experience he can account for perfectly well, and usually does. The fact is that "gas unaccounted for" with an intelligent system of gas works bookkeeping, is from two to three per cent. of the apparent leakage, and rarely more.

#### ENORMOUS ANNUAL LEAKAGE

What is the average leakage? Having studied this problem in every part of the United States and Canada, and in the principal cities of Great Britain, Belgium, Germany, France and Austria, I am prepared to say that in good practice the normal leakage of gas mains is 225,000 cubic feet per main per annum for an average diameter of six inches. It is frequently twice that amount; in some instances it is three or four times greater. In American practice leakage ranges from 10 to 30 per cent. of output. I will not start the controversy which would be excited by naming cities and towns and giving the actual figures of their gas leakage. Whether it is more or less for any given city, actually or relatively to other cities, is immaterial. It is everywhere large enough to be a matter of serious municipal concern. Those who want the exact facts can probably get them for any given locality without much trouble.

As illustrating how large a problem this may become, I will give the facts of one American city with whose municipal problems I have had some acquaintance. In 1900 the gas company supplying part of it had an output of twenty four thousand millions of cubic feet. The loss in distribution was about 11 per cent.; in round figures, three thousand millions of cubic feet. This was a little more than

1,600,000 cubic feet per annum per mile of mains in use. As it is in some respects a typical city with a typical gas leakage, it presents all of the typical municipal problems due to this cause. Let us see what are its economic and hygienic aspects of interest to students of such subjects.

The gas distributed in the city referred to costs at consumers' meters, about 60 cents per 1,000 cubic feet. This allows 30 cents in the holder, which is liberal, and as much more for interest on mains and connections, administration costs, etc.. The gas could not be sold for less than 60 cents from tight mains without loss. Three thousand millions of cubic feet at 60 cents, is \$1,800,000 per annum, which the consumer must pay in added charges upon the twenty-one thousand millions he uses for light and heat.

#### THE CONSUMER MUST FOOT THE BILL FOR LEAKAGE

What it costs the company to look after its mains, open streets, replace pavements, pay damages for lives and property destroyed I do not know, and have no means of learning. I doubt if a legislative committee with power to send for persons and papers could find out. The damage suits never come to trial; the facts of expenditures for street openings and main repairs are very carefully guarded. I do not think that a million dollars a year would be an excessive estimate. This also the consumer of light and heat must pay for. That he does so is indicated by the fact that the company is doing very well and paying, in addition to fixed charges, very satisfactory interest on a capital diluted to an extent which would put the high attenuations of the primitive Homeopathic pharmacopeia to the blush.

This gas is what is known as water gas. As made, it carries, on the average, 30.79 parts carbon monoxide, 30.14 parts hydrogen, 19.10 parts methane or marsh gas, 10.69 parts olefiant; the remainder being made up of small percentages of nitrogen, carbon dioxide and oxygen. Anyone familiar with the nature and phenomena of gases, will recognize that this is a very formidable compound to go at large in a city. Most of the three thousand millions of cubic feet of annual leakage is under measurably or absolutely impervious pavements. This means that it cannot work its way up through the soil and escape, like natural gas from a cross-country pipe line, but, leaking into what has been compared to a box with tight top and bottom and open sides, most of it in one way or another gets into houses. What it does there we shall presently enquire. Other facts, perhaps more obviously identified with the problems of municipal government, invite consideration first.

One of the first and most imperative requirements of a city making any pretensions of importance,—and the city of which I am speaking makes a good many, with some warrant,—is good pavements. To be "good" a pavement needs to be smooth, continuous, impervious to water, noiseless and durable. No other kind of pavement admits of the thorough cleaning which the protection of the public health demands. Probably the asphalt compounds meet these requirements better than any other paving material. In streets thus paved, or indeed paved in any way, the citizen has the right of unobstructed use, subject only to such intrusion as the public interest may require. A large gas leakage is inconsistent with good pavements or their maintenance. If to preserve them and avoid street obstructions main repairs are neglected, leakage quickly attains intolerable proportions. If necessary repairs are attended to the streets are quickly scarred with patches to cover the wounds of pick and spade. In the city to which I refer, I saw during less than twelve weeks of last winter from the windows of the house in which I lived, thirty-eight street openings within a space of less than 200 feet—every such opening made by men in the uniform of the local gas company and each large enough to hold two men and as deep as the gas mains were buried. Before spring this section of street looked as if someone had been searching it for the buried treasure of Captain Kidd. The obligation of replacing disturbed pavement devolves upon a company making street openings, but this obligation is one with which specific performance is impossible. Such a break can never be repaired. One cannot put back in a hole all the dirt he takes out of it, and the relatively loose replacement, even when water is employed to aid in settling the filling, leaves a soft spot which sooner or later makes a depression in the surface.

#### GREAT DESTROYER OF ASPHALT PAVEMENTS

In the case of asphalt, the destruction due to gas leakage is rapid



and complete. The first surface indication is a depression marked with parallel striations in the direction of the movement of traffic. This indicates that the binder has been decomposed, allowing the superficial layer to yield under the wheels of vehicles. A bar hole put down through such a spot will always find a gas leak. Gas may also be found in large quantities under sound asphalt—a phenomenon which has given rise to some confusion. The explanation is really very simple. What rots the binder of the asphalt pavement is neither the hydrogen nor the carbon monoxide. In fact, uncarburetted water gas would not touch it. The mischief is done by the naphtha enrichments composing the olefiant series. These are high solvents of everything bituminous. Gas which leaks from a buried pipe works its way upward until it strikes the binder of the asphalt. This is attacked by the olefiant, and decomposed. The gas, returned to the composition of uncarburetted water gas and inert, so far as asphalt is concerned, works its way in all directions until it finds some avenue of escape.

The disturbances involving street openings to which buried mains are subjected in cities are shown by some official figures from the last annual report published by the Department of Public Works of the city to which I have referred. These figures show that during the year one mile in four of the paved streets of that city was torn up for constructive purposes demanding longitudinal trenching. For transverse and local excavations, such as water or gas connections, repairs to gas or other mains, sewer connections, etc., 24,000 permits were issued, besides some six thousand openings made by the Department on account of repairs and extensions of water mains. Many of the permits to open the streets covered more than one excavation, so that more than 59,000 separate excavations were made under permit. Thus, in addition to one-quarter mile of longitudinal trench for every mile of paved streets, there were enough other street excavations to average one to every thirty-five feet of the 391.95 miles of paved streets within what were then the city limits. To the foregoing must be added more than 50 serious gas explosions in sewers and subways, which destroyed enough of the streets in which they occurred to interrupt traffic.

If street pavements were respected, cities would soon become uninhabitable by reason of the creation of subterranean conditions comparable to those which destroyed Martinique. If they are not respected the conditions which are now the subjects of so much just complaint will continue indefinitely. The solution for this anxious municipal problem would appear to be in pipe galleries. The experience of more than half a century has shown that the underground piping of gas by present methods is contrary to public policy, and in the highest degree inimical to the public welfare.

Gas does not remain very long in the earth. Filtered of its olefiant, which are its odor-imparting constituents, it works its way into houses, following the soft filling and open spaces around house drains, gas services and water services. Sometimes it forces its way between the stones of foundations. I have seen it do this in fine residences fronting on asphalted streets, to an extent which permitted the inflowing gas to be lighted with a candle. This is a dangerous amusement, but it has rare attractions for the typical plumber's cub. It also accumulates in sewers, subways and wherever opportunity offers for it to make its way. This disposition of it gives rise to a series of phenomena, widely various in character but equally worth studying as municipal problems of grave significance.

#### THE FIRE HAZARD INCREASED

The first of these is the fire hazard of gas leakage. This is a problem of such magnitude that the underwriters seem almost afraid to begin its consideration, not knowing where it will lead them. In December, 1899, a committee of the National Board of Under-

writers presented the subject in outline, as throwing light upon the causes of many mysterious and costly fires in New York and other large cities, and inviting its critical investigation. From this circular I quote as follows:

"The occurrence in New York during the past year of a number of fires and explosions which, studied in the light of the facts before this committee may be assumed to be due to the leakage of gas under impervious pavements, warrants the belief that the attention of fire underwriters should everywhere be directed to this important subject, to the end that it may be investigated under all conditions and from widely separated points of view. A comprehensive report embodying exact data gathered from all parts of the United States would be of great value to fire underwriters in cities, and would probably lead to the enactment of necessary legislation prescribing the conditions of gas distribution in populous districts."

In view of the known facts, some of which were set forth, this was a very conservative statement of the case. The fire hazard of gas leakage from defective mains, is incapable of exaggeration. It is enormously increased by the fact that gas which has passed for even a short distance through soil is thereby rendered nearly or quite odor-



ASPHALT PAVEMENT DAMAGED BY GAS LEAKAGE—BROOKLYN, N. Y.

less, and may be present in the proportions of explosive or inflammable admixture with air and give no indication of its presence to the senses. I have frequently obtained the reaction showing five, six and even seven per cent. of gas in air as free from the smell of gas as that of this room. I am of the opinion that a very large proportion of the unexplained fires in cities is due to gas. The inspectors of the Bureau of Buildings of New York lately began to look with an apparatus which I have reason to consider infallible, for gas in the air of theatres, music halls and other places of public assembly, and rarely fail to find it in proportions ranging from 0.2 or 0.3 per cent. to 5 per cent. This is in summer, with all the ventilation possible in the places where gas accumulates. What they will find in winter I would scarcely venture to predict.

#### THE HYGIENIC ASPECTS

The hygienic aspects of gas leakage are scarcely less serious. In the city under consideration the filtered main leakage carries somewhere between 35 and 40 per cent. of carbon monoxide. Some facts concerning this compound will be instructive to those who are not familiar with it.

Carbon monoxide is probably the most insidious blood poison known. Experiments upon animals warrant the belief that air containing anything more than 0.4 per cent. is capable of causing death in man, though anything over 0.2 per cent. would in many cases prove fatal. It has no smell or irritating properties. In order to fully understand the peculiar features of carbon monoxide poisoning, its mode of action must be examined. Dr. John Haldane, Professor

of Physiology, Oxford University, having conducted investigations with this gas in the study of dangerous trades for the British Home Office, points out that the oxygen absorbed from the air by the lungs is normally taken up in the form of a loose chemical combination with the red coloring matter of the blood corpuscles, known as hemoglobin, and so carried by the circulation to the tissues where it is used up. Hemoglobin has affinity for oxygen, but it has an enormously greater affinity for carbon monoxide—about 400 times greater,—and forms with it a much more stable compound than with oxygen. Hence, when the hemoglobin of a living animal is saturated with carbon monoxide oxygen can no longer be conveyed from the lungs to the tissues, and death ensues. When the amount of carbon monoxide absorbed by the blood represents about one-third of that required for saturation, the symptoms which are characteristic of it make their appearance, and 70 to 80 per cent. of saturation is quickly fatal. In a normal man the weight of blood to total weight of body is about as one to twenty-one. In volume this is about three litres. He breathes when at rest about five litres of air per minute. If this air carries 0.2 per cent. of carbon monoxide, he can absorb only 10 c. c. of it per minute, and it will require at least twenty minutes for distinct symptoms to be produced. Usually it takes somewhat longer. It is agreed among pathologists that the life of a healthy person is not likely to be destroyed by brief exposure to less than two or three per cent. in air, though very much less than this, say 0.3 per cent.,—may produce very severe symptoms. In consequence of the restriction of the oxygen supply to the tissues during prolonged exposure to even very small percentages of this gas in air, serious changes may be produced in the brain, heart and other organs, in cluded among the characteristics of anemia. J. J. Concannon, M. D., of New York, who has very carefully studied gas poisoning, says:

#### GAS POISONING

"Nearly all writers on the interesting subject of the causes of decreased longevity and diminished resistance to morbid influences in the case of city dwellers, have cited excessive mental work, increased competition, overcrowding, noises, impure foods, etc., as the principal causes. Only very recently has mention been made of the poisonous action of the illuminating gas present in large and ever increasing percentages in the air of cities. Every one knows how fatal is its effect when in large quantity in enclosed spaces. The blown-out gas flame is a frequent, potent factor in the annual death list of the city. Nevertheless, few seem to be aware that this gas, carbon monoxide, exerts its deleterious effect, be the quantity present in the atmosphere ever so small. For years the writer has insisted that the principal cause of the anemia and lowered vitality, which sooner or later appear in all city workers, is the illuminating gas with which the city atmosphere is heavily charged through leakages in the street mains and distributing pipes. When inhaled in large quantity carbon monoxide produces a permanent change in the red blood cells, rendering them unable to carry on their function of oxygen absorption and distribution, thus causing a profound anemia, often fatal, and only recovered from after prolonged and careful treatment, when new cells shall have replaced those destroyed. When the air contains but a small percentage, a gradual but less pronounced anemia gradually but surely appears, accompanied by diminished vital activity and resistance to disease. Doubtless this will be recognized eventually as the cause of the readiness with which the city dweller contracts grippe, tuberculosis, colds, bronchitis, pneumonia, hay fever and many other diseases, as compared with his fellow who dwells in the pure and strengthening air of the open country. It is said that, without some admixture of country stock, city families die out with the third generation. Further chemical and microscopical examination of the blood seem to confirm these views, as they usually show the injurious effect of prolonged city life upon the red blood cells."

My study of the mechanics of hygiene, made practical by some thousands of house inspections, leads me to believe that most of the evils attributed to "sewer gas" in cities are due to carbon monoxide, which is not a product of organic decomposition in sewers, and is there only because gas which leaks from mains into the soil tends to accumulate in just such pockets as the sewers offer. In a number of gas lighted cities I have taken readings of the air of

sewers for the carbon monoxide reaction and have never failed to find it in relatively large quantities, from 2 to 3 tenths of one per cent. to more than seven per cent. It is carried into and through house drains by the air which is drawn upward by soil pipe extensions making upcast shafts and, escaping into living and sleeping rooms, vitiates their atmosphere and is mainly instrumental in causing the mischief which is attributed to bad drainage. Only very recently has the means of making approximate quantitative analysis of carbon monoxide in air by color reactions been available, and tests have not yet been made with it under the conditions which will exist when closed windows and doors and artificial heat emphasize the evils to which it gives rise. But during April and May, when summer conditions existed, some very interesting experiments were conducted by the Committee on Hygiene of the New York County Medical Association. These pointed very clearly to the agency of unsuspected gas in causing types of persistent general malaise which resist treatment as long as the victim is exposed to the malign influence of carbon monoxide in the air of living and sleeping rooms. When gas was found the patients were promptly removed to a different environment, with immediate recovery, only to relapse into their former condition when temporarily returned. In each of these instances the access of gas to the house was from the sewer through the house drain, and its escape was from defects in the plumbing. This phase of the subject has not yet been so thoroughly investigated as to furnish cumulative evidence as a basis for generalizations. It will have been by this time next year. No more inviting field for original research and clinical observation is offered the medical profession in cities lighted with water gas than this furnishes.

#### WHAT IS THE REMEDY

What is the remedy for the large and increasing leakage of gas in distribution? While not prepared to answer this question in a manner satisfactory to myself as an engineer, I have no hesitation in expressing the belief that if a remedy is not found the time is not far distant when the gas industry will have to be suppressed as a public nuisance, dangerous to life and detrimental to health. Concealment of the truth is not a step in the direction of a solution of the problem of distribution with a negligible leakage. Let us know what we are dealing with, at least. To this end I advise an effort on the part of every municipality to secure the enactment of laws requiring the gas companies enjoying franchises for the use of public streets and highways to make their statistics public. As a form of bill adapted to the requirements of this particular case I suggest the following, which has been three times offered in the legislature of New York and smothered in committee for the reason that it had no popular support strong enough to neutralize the influence of the gas companies:

#### AN ACT TO PROVIDE FOR REPORTS OF GAS MAIN LEAKAGE UNDER STREETS AND PUBLIC ROADS

The people of the state of.....represented in Senate and Assembly, do enact as follows:

*Section 1.* Every Corporation, firm or individual manufacturing and selling illuminating or fuel gas in the state of....., and distributing the same to consumers through pipes laid under avenues, streets, highways or public roads, shall report twice in each year to the State Board of Health.

*Section 2.* Every such semi-annual report shall fully and truthfully record the following information for the six months ended with June and December immediately preceding its filing

- A. Amount of gas made, in cubic feet.
- B. Amount of gas sold, in cubic feet.
- C. Amount of gas consumed in works, offices, etc., in cubic feet.
- D. Amount of gas unaccounted for, in cubic feet.
- E. Length of mains in use.
- F. Average diameter of mains in use.
- G. Gas unaccounted for per mile of main.
- H. Percentage of gas unaccounted for to total output.

*Section 3.* Every such report shall also show for the period covered by it, what claims for damages to persons or property, resulting from the leakage of gas in distribution, have been adjusted, compromised or settled out of court, by or on behalf of the corporations, firms or individuals reporting; also, what judgments for loss or damage resulting from gas leakage have been entered against



them; also, what suits against them, based on allegations of damage to persons or property from gas leakage are then pending.

*Section 4.* Every such report shall be attested by the President or acting president, the head of the firm or the individual proprietor making it, and of the manager, superintendent or engineers of the works, and such signatures shall be duly acknowledged under oath before an officer qualified to take sworn depositions.

*Section 5.* The semi-annual reports required by this act shall be forwarded to the State Board of Health by or before the fifteenth day of January and July in each year.

*Section 6.* It shall be the duty of the State Board of Health to promptly transmit copies of such report to the Mayors of the cities or the Boards of Health of the towns in which the corporations, firms or individuals reporting conduct their business under permission to open streets and lay or repair gas mains; and shall accompany such copies of reports with such suggestions as said board may consider necessary for the public welfare and the better protection of life and health. It shall also be the duty of the State Board of Health to report to the Governor, from time to time, with recommendations as to the measures for the regulation of gas distribution in cities and towns as may be warranted by the information before it.

*Section 7.* In cases where the leakage of gas in distribution is

found to be excessive, or where for any reason it entails or threatens danger to life or property, it shall be the duty of the State Board of Health to investigate the causes of such exceptional leakage and to take such steps to abate the nuisance as its powers may permit or the public interest demand.

*Section 8.* If any corporation, firm or individual required to make the reports provided for in this act, shall refuse or neglect to fully and truthfully give the information called for by it, it shall be the duty of the State Board of Health to demand that such reports be made forthwith. In the event of continued refusal or neglect of any corporation, firm or individual to comply with such demand within thirty days, it shall be the duty of the Attorney General, on notification by the State Board of Health of such continued neglect or refusal, to forthwith apply to a court of competent local jurisdiction for an order enjoining and restraining such corporation, firm or individual from the further prosecution of the business of manufacturing, distributing and selling gas until the provisions of this act shall have been complied with to the satisfaction of the court.

*Section 9.* This act shall take effect immediately.

The object of this bill is to place the facts at the command of those for whom they have interest. The danger of gas leakage is not reduced or mitigated by concealment. The first step in the direction of reform is to make the need of it known.

## REGULATING SALOONS IN GOTHENBURG

Originated by a Newspaper Man—Just What It Is—Its Rapid Growth—Excellent Results

By J. A. Johnson\*

MUCH has been said and written about the celebrated Gothenburg system of regulating the saloon or liquor traffic. Some of it, no doubt true, but much of it, especially by those who favor an unrestricted sale of liquors, very much the reverse of what the facts actually are.

If liquors must be sold it cannot be denied that the sale should be under absolute control of the municipality.

While visiting Sweden last year I had the good fortune to secure some official information, giving the results of this system after twenty-five years' experience.

### ITS ORIGIN

On March 31, 1865, Mr. S. A. Hedlund, the editor of the Gothenburg *Commercial Gazette*, offered at the meeting of the municipal council, a resolution providing for the appointment of a committee whose duties it should be to prepare a new system for the regulation of the liquor traffic in Gothenburg. That committee made its report the following month. Among other recommendations made by the committee were the following:

"To prohibit the sale of intoxicants on credit.

"To prohibit the sale of intoxicants to persons of tender years and inebriates.

"To provide decent, well lighted and well ventilated premises for the sale of intoxicants, proportionate to the traffic.

"To provide cooked food at moderate prices at public houses.

"To make drink dearer and harder to obtain.

"To lower the percentage of alcohol.

"To limit the quantity of spirits procurable by any one person at any one time.

"To raise the limit of age for young persons to whom spirits may be sold.

"To shorten the time for keeping open where spirits may be sold for consumption.

"To restrict the public house traffic and to turn the same into eating houses."

### HOW IT WAS TO BE ACCOMPLISHED

To carry these recommendations into effect, it was proposed that

\* Ex-Mayor of Fargo, N. D., and ex-President of the League of American Municipalities. The paper was read before the sixth annual session of the League, held at Grand Rapids, Mich., August 27-29, 1902.

the authorities transfer the public house licenses to a company, which not for individual profit but in the interest of the working classes would undertake the business.

A petition signed by some of the leading men of the city of Gothenburg, was submitted to the municipal council. The petition for a charter was known as "The Gothenburg Public House Licensing Company," and on August 22, 1865, the same was approved by Charles XV, King of Sweden.

Paragraph III of the chapter provided that the capital stock should not exceed 200,000 kronor, or \$56,000.

Paragraph XV reads as follows: "As the object of the company is to promote the general welfare, it follows that the members thereof can lay no claim to its profits, which when expense of management, and six per cent. annual interest on the capital invested by the stockholders, have been paid, the balance shall annually be made over to the treasurer of the city of Gothenburg."

Paragraph XVI of the charter reads as follows: "That the directors are authorized to appoint managers for the company's public house traffic, as well as agents for the retail traffic, such persons as possess the requisite qualifications. The managers so appointed are personally responsible for the strict observance of all the rules and regulations made for the government of the public house and retail traffic in liquors, wines, etc. They must also obey such instructions as the directors may, from time to time, issue, which rules and regulations will also be binding on all the officials, or agents whom the company may engage in their service."

### SOME OF THE RESTRICTIONS

The contract between the Company and its managers, among other things, provides as follows: "The managers are bound to supply the public with well cooked food, either warm or cold, as may be demanded, as well as coffee, tea, cocoa, small beer, aerated waters and cigars, all on his own account."

He binds himself to sell liquors, wines, beer and stout for cash only, to be paid at the time of sale; to keep polite and attentive servants; to keep the premises clean, airy, well lighted and well heated, according to the season.

The manager is expressly forbidden to sell intoxicating drinks to persons who show the effects of drinking or to persons who are under

age or to persons who pay renewed visits within short intervals, for the purpose of obtaining drinks.

The manager is absolutely bound to sell the company's liquor at a price fixed by the Company of which a schedule is posted up in each public place and is bound to sell the same as received from the Company and is prohibited from adding any ingredients, or otherwise altering the quality.

Once every three months, the directors meet and fix the expenses of each of the managers, taking into consideration the number of servants employed, their food, maintenance and wages and such other expense as heat, light, janitor work, damage to furniture and finally, to fix such remuneration as the directors may deem just for the personal services of the manager.

The last clause provided that either party may cancel the contract by giving notice of his intention so to do. It also provides that the Company can dismiss the manager without notice, or compensation, if any of the rules and regulations of the Company have been violated.

All wines and liquors are furnished by the Company and they are of the purest quality that can be obtained; all are inspected by inspectors appointed by the city authorities and the goods must be sold from the original packages.

#### GOOD RESULTS ACHIEVED

While the Company was organized in 1865 it was not until ten years later that it came into possession of all the places where wines and liquors were sold. Between 1875 and 1900 the consumption of intoxicating drinks in Gothenburg had decreased more than fifty per cent.

From the year 1875 to 1898 inclusive the profits from the sale of wines and liquors, turned by the company over to the city of Gothenburg amounted to 16,282,360 kroners, or \$4,558,958.80. It may be of interest here to note that in 1868, before the company had full control of the liquor traffic, there was one public house for each 2,293 inhabitants, while in 1899, there was one public house for each 8,158 inhabitants. In 1875 when the company came into full control, there was one place where strong drinks could be obtained for each 8,569 inhabitants, while in 1899, there was one place where strong drinks could be obtained for each 17,481 inhabitants.

I quote the following from the regulations as to the time that wines

and liquors may be sold, viz., "The existing laws enact that retailing shall take place on week days from 8 a. m. until 7 p. m., and the public house traffic shall not begin earlier on week days than 9 a. m. and shall generally cease at 10 p. m. That no spirits shall be sold Sundays or Holy days, except to persons taking their meals at the public house.

"Meals shall cease at the Company's public houses for workmen on week days from October to March, at 6 p. m., and from April to September at 7 p. m." The company has provided seven large reading rooms in different parts of the city that are free to the public, where all the periodicals and magazines of the day, including foreign periodicals, can be read.

#### HOW THE REVENUE IS USED

The revenue derived from the liquor traffic is devoted principally to the beautifying the parks and public places, public hospitals, public baths and otherwise for the benefit of that part of the public least able to procure the same.

From the idea of Mr. Hedlund, as given to the public, the system has spread to nearly every city and village, not only of Sweden, but Norway also, where it has been legally established; and even to the Russian possession of Finland.

The Gothenburg system has the highest endorsement from the Governors of nearly all the Provinces of Sweden. I will take the liberty of quoting from the Governor of the Province of Kroneberg, a province that I have some recollections of as a child and where I saw the difference in February, 1901. He says: "There can be no doubt that the transfer of the liquor business to a company in Vexio has had good results in furthering the cause of morality and order. In place of the former close and filthy slums, where every kind of iniquity prevailed, where fights and other acts of violence were the order of the day, the company has provided airy, roomy premises, where order and cleanliness are found to prevail under ordinary circumstances. The strict regulations by which the manager is bound and above all, the excellent rules that they shall not derive the slightest profit from the sale of the liquor but solely from the sale of food, thus being free from self-interested motives for encouraging the consumption of spirits, has shown very beneficial results so that the police are very seldom required to interfere in preserving order in the public houses."

## THE FIRE DEPARTMENTS OF OUR CITIES

### Description of Baltimore's Department—Well Equipped and Manned—Economical Methods in Purchasing Supplies

By John H. Sirich\*

THE Fire Department is the head of the Department of Public Safety of Baltimore, and its affairs are conducted and controlled by a Board of Fire Commissioners, consisting of three members, all of whom are business men, and not politicians, and were appointed by the present head of the city government without influence of any kind save his belief that they would conduct its affairs honestly and to the best interest of the taxpayers and citizens. They receive a nominal salary of \$1,000 a year each. The Chief Engineer is the executive head of the department.

Baltimore is the fifth city in the Union, with a population of about 517,000 and covers an area of 33 square miles. The Department is a full paid one, and there are 408 officers and men in active service.

#### PENSIONS AND SALARY

The members of the department are pensioned after twenty consecutive years of service, or in case of disability can be pensioned on half-pay at any time. The men are also in care of a Department Surgeon, at the city's expense, and receive their salary during disability arising from sickness or accidents. In case of death from accident, their heirs or representatives, receive from the city the sum of \$500; also from insurance, the premium of which is paid by the

city, an additional \$500, or a total of \$1,000. They are allowed, on an average, fifty days in a year, without loss of pay.

Our salary list is fixed by law and amounted last year to \$362,808.28. The Chief Engineer receives \$2,000 per annum; district engineers and superintendent of machinery, each \$1,400; captains of engine and hook and ladder companies \$1,100; lieutenants of the same \$1,000; enginemen \$1,100; assistant enginemen, tillermen, hostlers, captains of combination hook and ladder companies and captains of chemical engine companies, each \$900; hostlers of chemical engine companies, hostlers of combination hook and ladder companies, pipemen and laddermen, each \$800; pilots \$1,000; stokers \$800, and probationers \$500.

We have in service 21 steam fire engines, 21 combination hose wagons (chemical engine and hose wagon), 18 hose carriages, one water tower, one fire boat, 8 Hayes aerial trucks, 3 combination trucks (chemical engine and truck), one bank ladder truck, 3 chemical engines, 7 district engineers' wagons, 1 superintendent of machinery's wagon, 2 wagons for the chief engineer, 3 wagons for the telegraph department, 1 large wagon for construction department, 1 supply wagon and 5 fuel wagons. In reserve we have six steam fire engines, 2 Hayes aerial trucks, one water tower, 2 combination hose wagons, 2 district engineer's wagons and three chemical engines. This constitutes the entire plant of the Department, requiring the services of 188 horses.

\* Member of the Board of Fire Commissioners, Baltimore, Md., who read this paper before the sixth annual session of the League of American Municipalities, held at Grand Rapids, Mich., August 27-29, 1902.



The fire hydrants in service on January 1st, 1902, were 2,673. The number of alarms of fire of all kinds in 1900, was 1,458, and in 1901, there were 1,498; and the number of alarms for the present year, up to July 1st, is 766.

#### A GOOD RECORD

In our city we have a record in not having had what is known as a "block fire" for upwards of twenty years, although we have had some pretty severe conflagrations. This is attributed to the efficiency of the men and apparatus. We always fight fires at close range, entering the buildings at once on arrival and attacking the element where it starts, or drive back to that point if it has gained any headway.

Since the incoming of the present administration, politics have been kept entirely out of the Department, and the men receive their promotion on account of their good record and abilities as firefighters.

Another point that is most desirable is entire accord between officers and men. The Chief Engineer particularly should have the firm support of all his subordinates, not merely a perfunctory support, such as is due to him as a superior officer, but a sincere and earnest help and aid, ready at all times to give him all assistance needed. Our Chief Engineer, George W. Horton, I am glad to say, is in this position. He has had a remarkable career, entering the service when a mere boy, under what was known as the "call system," and he has won his present place by merit alone, working his way through the various grades until he has reached the top. During his forty years of service he has never been before any Board, under which he has served, for a violation of any rule, no matter how trivial. His long experience you will thus see and the manner of his promotions make him an ideal man and officer. The commissioners, as a rule, in all things pertaining to the men and apparatus, usually follow the chief's advice, as to what is best for the maintenance of the Department, and the perfect confidence existing between the Board and Chief adds to the thorough discipline and successful work of the force.

#### KIND OF APPARATUS PREFERRED

As to steam engines, our preference is the "La France" type, because our Chief so recommends, and in our city at least it has been proven that they are the most serviceable. It is the same with the hook and ladder trucks; the Hayes Aerial Trucks being used, and no others. We find also that a very useful part of our apparatus is the combination trucks, as we term them, being a wagon rigged with ladders, chemical tanks and 750 feet of 2½ inch fire hose; they are valuable in the outlying districts where dwellings predominate and water pressure of such strength as to use the hose without the aid of a steam engine; also the combination hose wagons, which, in addition to carrying 1,000 feet of fire hose, are rigged with two thirty-five gallon chemical tanks, with 250 feet of chemical hose, and many a large conflagration and serious water damage have been prevented by the prompt arrival of these hose wagons.

The present municipal administration took office pledged to a wise and economical expenditure of the people's money, and that pledge has been strictly adhered to, permeating every branch of the city government.

The Board of Fire Commissioners on accepting office considered themselves equally pledged and the first act of the Board was to put the department on a strict business basis, all purchases being made only after every opportunity had been given for all the competition that could be gotten. No favor, influence, rebates, or commissions being allowed to stand in the way of absolute fairness in awarding contracts to the lowest bidders. This has resulted in a saving in expenses of something like an average of over \$20,000 per annum. The expenses of the Department for the past two years amounted to \$210,084.76, as against \$260,798.72, for the previous two

years, without any impairment to the service, in fact the service has been very much improved.

#### ECONOMICAL PURCHASE OF SUPPLIES

One of the most vexed questions encountered was the purchase of hose, the department having been paying for certain brands, \$1.00 a foot. It was believed that other hose could be gotten just as good at a lower rate, especially if all rebates, commissions, etc., were eliminated. A competitive bid showed that hose could be purchased at 65 cents per foot, with all the guarantees of the \$1.00 kind, and would stand the water pressure just as well. Acting on the recommendation of the Chief Engineer, such has been purchased for the past two years and the result has more than justified our expectation. I would add that the last lot of hose purchased cost 55 cents per foot. We use in the Department, Fabric hose only. All tests of hose is directly in charge of the Chief Engineer, and his long experience (for years before he was Chief he tested all the hose that came into the Department), qualifies him admirably for this work.

We believe no Department in this country has a better set of men than can be found in our city, and considering their numbers, the few trials for infraction of the rules, is a remarkable record, and proves what thorough discipline exists. No one is appointed over thirty-five years of age, and must weigh, stripped, at least 145 pounds. Every man knows that all he has to do to hold his position is to do his duty. No pull, political or other influences, being necessary to aid him. It is our experience that the best class of firemen are found amongst those who come from the class of mechanics, as that class seems to be better fitted in all respects for the work than what might be known as the mercantile or clerical class.

#### CLOSELY ALLED WITH OTHER DEPARTMENTS

Another advantage might be recited, which aids to some extent, efficiency, and that is close and pleasant relations with other departments of the city having direct relations with the Fire Department. The Inspector of Buildings, who has charge of the buildings and repairs to the engine and truck houses, has been a most valuable help to us in modernizing all work his department has been called on to undertake, extending facilities that tend, not only to more comforts for the men, but also readier handling of apparatus and horses.

The Water Department is another department very necessary for efficient fire service, and the Water Engineer is a faithful ally. We have 675 miles of mains and our reservoir capacity is 2,246,000,000 gallons daily. The Gunpowder river, part of our supply, yielding in dry weather some 90,000,000 gallons daily. They have lately given us a new fire hydrant, invented by the mechanical branch of our Water Department, which permits two engines to work from the same plug at the same time, without interference whatever. The plug has no frost casing and no galvanized iron covering at the top; it is tapered from top to bottom so that frost cannot lift it, and is eight inches at the top and ten inches at the bottom in diameter; the waterway main valve closes with pressure and not against, as with the old style, the drip valve does not open until the main valve is closed and closes before the main valve is opened. The whole interior working parts can be taken out without removing the hydrant in the event of repairs being needed. We expect greater results from this new pattern of hydrant, and they will be immediately installed in the thickly settled parts of our city and the congested districts.

Like all cities we are more or less afflicted with false alarms, but I think the percentage of these to true alarms is much less than similar places of the same size. Several devices have been suggested to cure this evil, but up to the present time, I believe no standard arrangement has been perfected.



# AMERICAN ROAD MAKERS IN MICHIGAN

**Governor Bliss Stands for Improved Highways—Famous Road Builders Present at Last Meeting—Experience at Home and Abroad**

*By Our Special Correspondent*

ONE of the most active centres of the good roads movement is in the state of Michigan. This is due to the fact that the president of The American Road Makers, Senator Horatio S. Earle, lives in Detroit. Under his direction a good roads train has been going the rounds of the state, giving exhibitions and building samples of good roads for the sake of teaching the Michigan farmers and others how to improve roads. The last stop was made at Greenville the last of July. Three days were devoted to a general discussion of the whole subject, and noted road builders from various parts of the country were present. Many thousands of people were in attendance. Governor Bliss of Michigan, gave an address on Government Day, and others were given by the Hon. Martin Dodge, Director of Public Roads



SENATOR EARLE'S GOOD ROADS TRAIN HAULING 1,000 PEOPLE FROM GREENVILLE, MICH., TO A PLACE NEARBY, WHERE THE AMERICAN ROAD MAKERS WERE BUILDING A SAMPLE OF GOOD ROADS

Inquiries, Washington, D. C., and Col. W. L. Dickinson of Springfield, Mass., President of the Connecticut Valley Highway Association. Dr. A. W. Nichols of Greenville, was the enthusiastic chairman of the local committee, and a large share of the success of this particular gathering was due to his wise forethought and energy.

## GOVERNOR BLISS'S CONTRIBUTION TO GOOD ROADS

Gov. Bliss, during his talk, referred to the fact that he had been often criticised for making certain appointments because of the inefficiency of the appointee, but he felt sure that no one would think of making such a criticism in connection with the appointment of Senator H. S. Earle of Detroit, as the chairman of the commission which he appointed to investigate and report upon the condition of Michigan highways. "As a result of that appointment we have to-day one of the most progressive movements for better highways to be found in the United States and a commission that is thoroughly alive to the situation. I may say in advance of receiving the report that I am conversant with the fact that certain recommendations will be made which cannot fail to meet general approval. One of them is the creation of a state engineer of highways and the appropriation of a fund to be used for the administration of road building. This I believe to be a step in the right direction."

In referring to the Federal work, Director of Public Roads Inquiries Dodge of Washington, said in part:

## COULD USE PRISON LABOR

"In many countries the army has been used to advantage in time of peace in building up and maintaining the highways. There is no army in this country for such a purpose, but there is an army of prisoners in every state, whose labor is so directed, and has been so directed for generations past, that it adds little or nothing to the commonwealth. The labor of these prisoners, properly applied and directed, would be of great benefit and improvement to the highways, and would add greatly to the national wealth; while at the same time it would lighten the pressure of competition with free labor by with-

drawing the prison labor from the manufacture of commercial articles and applying it to work not now performed, that is, the building of highways or preparing material to be used therefor.

"The general government, having withdrawn from the field of road construction in 1832, has since done little in that line until very recently. Eight years ago Congress appropriated a small sum of money for the purpose of instituting a sort of inquiry into the prevailing condition of things pertaining to road matters. This appropriation has been continued from year to year and increased during the last two years with a view of co-operating to a limited extent with other efforts in road construction. With a view to securing scientific facts in reference to the value of road-building materials, the secretary of agriculture has established at Washington, D. C., a mechanical and chemical laboratory for testing such material from all parts of the country. Prof. L. W. Page, late of Harvard University, is in charge of this laboratory, and has tested many samples of rock without charge to those having the test made. There is, however, no test equal to the actual application of the material to the road itself.

## BUILDING OF SAMPLE ROADS

"With a view to making more extensive tests than could be done by laboratory work alone, the director of the office of public road inquiries has during the past two years co-operated with the local authorities in many different states in building short sections of object-lesson roads. In this work it is intended not only to contribute something by way of co-operation on the part of as many different interests connected with the road question as possible. The local community having the road built is most largely interested, and is expected to furnish the common labor and domestic material. The railroad companies generally co-operate, because they are interested in having better roads to and from their railroad stations. They, therefore, contribute by transporting free or at very low rates the machinery and such foreign material as is needed in the construction of the road. The manufacturers of earth-handling and road-building machinery co-operate by furnishing all needed machinery for the



THE FIRST GOOD ROADS TRAIN—IN SERVICE AT FIRST INTERNATIONAL GOOD ROADS CONGRESS, PORT HURON, MICH., JULY, 1900



most economical construction of the road, and in many cases prison labor is used in preparing material which finally goes into the completed roadbed. The contribution which the general government makes in this scheme of co-operation is both actually and relatively small, but it is by no means of this limited co-operation that it has been possible to produce a large number of object-lesson roads in different states. These have proved very beneficial, not only in showing the scientific side of the question, but the economical side as well.

Senator Earle talked to the general question of "Better Roads, Why, How, When, Where?" He discussed the transportation question very thoroughly and used convincing arguments to show the wisdom in larger expenditures for the improvement of highways, emphasizing the fact that the farmer would be the larger gainer. He called attention to the fact that the Constitution of the state of Michigan contains a clause practically prohibiting any state aid for highways and so long as that remains it will be impossible to get any help from the great cities of the state toward the betterment of roads. This particular clause was put there by the farmer, it is kept there by the farmer and can only be removed by the farmer.

#### SENATOR EARLE'S RECOMMENDATIONS

Senar Earle has a broad view of the good roads situation, therefore his recommendations are worthy of consideration and will doubt-

to report to such state engineer every year what the condition of the roads in his township is, how much money and statute labor has been expended during the year, so that it may be possible to know just how many miles of public highway there is in the state, just what amount of money is expended in building and repairing and many other things important to know.

"This would practically form a road inquiry office in the state, and the state engineer would be able to convey the information obtained that was good from one county to all other counties; he would be able to tell any township where the best gravel and stone was situated and what it would cost them to obtain it; he would be able to advise them about what it would cost to build and repair both roads and bridges; he would be subject to call from any township that needed him, and be paid by the state."

Col. W. L. Dickinson went all the way from Massachusetts to participate in this good roads gathering, his subject being "Massachusetts to Michigan on a Through Road." His address in part was as follows:

#### DICKINSON TALKS BITUMINOUS MACADAM

"We very much desire to come to Michigan on a through road, and to us it seems an easy matter to build such a road, as we have a first class road in Massachusetts nearly completed across the state



BEFORE



AFTER

WHAT THE AMERICAN ROAD MAKERS ARE DOING FOR GOOD ROADS IN MICHIGAN

less have their influence on the work of the next state Legislature. "I recommend," said he in his address, "that the next Legislature give to the voters of Michigan the privilege to say at the polls whether they want to change the constitution so as to permit of state aid or not for permanent intertown highways; and should they vote to allow state aid I would advise adopting a similar system to the Connecticut plan, which is the awarding rewards to townships that build intertown highways according to the specifications adopted by the state.

"I would like to see the legislature that should convene next after such a vote had been given, make an appropriation of \$25,000, to be divided into 50 rewards, to be given to the first 50 townships which should complete an intertown mile of permanent road built after the specifications furnished by a state engineer, when accepted by him.

"First, however, I recommend that the next legislature establish the office of state engineer, he to have a fair salary and expenses, he to hold schools of instruction, teaching how to build and repair all kinds of roads, and to hold one of these schools in each county of the state each year, at which all highway commissioners and pathmasters in each county should attend and be paid for their days' attendance the same as they would if working on the road and the cost to them to get to the county seat or elsewhere where the engineer should hold such school.

"I would recommend that every highway commissioner be obliged

from Boston to our western boundary. The state of New York has met us there and has constructed a long section of road which undoubtedly will be continued across the state. The Massachusetts road has been built partly by state aid and partly by cities and towns.

"It would not cost as much to build such roads in Michigan, as you have less rough and rugged land to deal with than we have in Massachusetts. All you have to do with your soil is to tickle it with a hoe and make it laugh with a harvest, and the saving made in transporting that harvest over a stone road would soon build one. Your farms would increase in value, you would not require as much motive power as at present to haul your products to market, and you could take advantage of the markets at all times and smile at King Mud. You would have a better acquaintance with your friends at a distance, as with good stone road you could drive over it in all seasons. Good roads make life in rural communities livable. They will help make us good citizens if we will let them. When you are wearily plodding through the mud some blustering March day, you can know that in some eastern state your friends are jogging along on a hard, smooth road, and I hope you know that in due time that hard, smooth road will reach your part of the country.

"From the Massachusetts boundary a continuous road could be built to Michigan, as there is plenty of road material available which,

if not directly on the line of the proposed road, could be cheaply transported by rail. It would be best to use crushed stone in the construction between cities. The cities and larger towns require something more durable than ordinary macadam and better suited to heavier traffic. Such a road could be built by using Warren's bituminous macadam waterproof pavement, which is being generally adopted in up-to-date cities and towns.

"When we take into consideration the large sums of money that have been expended on the roads of Europe and the immense value of these excellent roads to the countries that have them, it would seem as if this progressive country ought to profit by their experience and improve on their system, as we excel in every other thing.

#### ROADMAKING A MATTER OF BUSINESS

"The building of a through road from Massachusetts to Michigan is simply a business proposition. What return are we to get for the money invested? This could be discussed on facts which are at hand in relation to the benefits derived from the improved roads of Europe. It is much better, however, to give the experience of a state in our own country. The state of New Jersey, the first state in the Union to give state aid, has been building roads since 1891. That state has secured the best results of any state giving state aid because they went at this work in a businesslike way and have a plain practical system. There were 549 miles of state road built prior to January 1, 1902, at a total cost of \$2,650,000. Of this amount the state paid \$866,000, the counties paying the remainder. The increase of \$27,000,000 in the value of taxable property in New Jersey is attributed in a large measure to the excellent roads. The cost of these roads has not been a burden. The benefits derived are found in the greatly increased valuation of property, a large increase in population of a desirable class and in all lines of trade. The farmers find a great advantage in the easier passage of their products to market and a large saving in the wear and tear of their horses and vehicles. Over a continuous good road heavy loads are hauled with a less number of horses than was formerly required for a small load on a poor road. The attendance of schools and churches are noticeably enlarged and free rural postal delivery made possible result from having good roads.

"In 1893 the Massachusetts legislature passed an act to provide for an appointment of a highway commission to improve the public roads.

The first appropriation for state aid was made in 1894, and some over \$4,000,000 has been expended to improve the roads of this state. The cost of the roads is as follows: The state pays three-quarters and the county one-quarter. The cost of these roads has varied from \$2,500 to \$15,000 per mile, according to the conditions which were met.

#### SPECIFICATIONS

"The standard width of broken stone roadway as built by the Massachusetts commission is 15 feet, and each side of this a width of three feet is shaped to the same cross-section as the broken stone. These side strips or shoulders are covered with gravel on much traveled highways only, on all others the natural soil is used. The rock used for the stone roads has come from quarries, banks, fields and river beds. There is great variation in the quality of rock used. In the selection of road building rock traffic and cost are carefully studied, and the cost of maintenance, as well as construction, is taken into account. Trap rock is unquestionably the most economical material for the surface of roads of heavy traffic. All Massachusetts state roads are compacted by the use of steam rollers, both during construction and permanent repairs.

"All broken stone used is separated into three sizes by passing it through a screen with meshes  $\frac{1}{2}$  inch,  $1\frac{1}{2}$  inch and  $2\frac{1}{2}$  inches in diameter. The thickness of stone on these roads varies from 4 inches to 16 inches—the 4-inch covering being placed over good gravel or sand, the greater amount over heavy clay and varying thicknesses on other soils. Where the travel is light, gravel roads have been constructed, and good results have been obtained. On the sandy shores of Cape Cod, where it would have been very expensive to haul broken stone, a good road was built with sand, clay and broken stone mixed, which under the conditions, very light traffic and perfect drainage, have proved very satisfactory. Large sums of money have been expended where necessary for underdrains.

"As a result of these good roads built by the state, the cities and towns have generally taken up this question of better roads and have made a great improvement in their systems, as they were quick to realize the value of good roads. Although the Massachusetts system is complicated and expensive the good roads have proved of great value to the people. In Massachusetts the commission endeavors to improve the main arteries of travel between the important centers of trade."

## MEMPHIS TO OWN ITS WATER PLANT

### Experts Report on the Present Situation—City Can Build Plant to Use River Water—Water Meters Recommended

THE expert engineers, Messrs. J. A. Omberg, Jr., Arthur Hider and A. T. Bell, who were employed by the city of Memphis, Tenn., to investigate the water question, have handed in their report. They were to report on the value of the plant of the Artesian Water Company, which supplies the city with water, the present condition of this plant and the probable cost of extensions to its mains, etc.

The water is obtained from a stratum of water-bearing sand 300 feet below the surface. Steel tubes are sunk through the upper clay to the sand stratum and the water is collected through them. Experience has shown that the system of wells has been adequate to the demands thus far presented, and chemical analysis and the marked reduction of the death rate accompanying the extension of the mains indicates the purity of the water. The permanence of the supply, depending on the rainfall, can be assured. Experiment has shown, say the engineers, that the quantity of water discharged from a given well varies directly with the head of the flow, but in practice these quantities vary and the discrepancy is due to the size of the wells and the freedom with which the water enters the strainer at the bottom of the wells.

#### CAPACITY OF THE PRESENT PLANT

When the condition of the supply was at its worst, in October, 1899, the maximum rate of yield was about 10,200,000 gallons per day. Increase in the number of wells brought the yield up to 19,000,000 gallons a day. The increase in the rate of yield due to increasing the

number of wells, is not entirely permanent. This is due to deterioration in individual wells. This rapid reduction of the average flow is unavoidable and is due to the voids in the coarse sand about the strainer becoming filled by finer sand which is carried by the water from the surrounding areas.

The average supply of fifty wells for the past four years shows a yield of 14,900,000 gallons per day. Cleaning the strainers and sinking other wells would bring up this supply some five millions of gallons. The rapid growth of the city, according to the experts, will shortly cause a demand for from twenty to thirty million gallons a day and, as the capacity of the plant is soon to reach the limit, provision must be made for an increased supply. Flushing the wells always increases the output, but the effect of this seems to wear off in three or four months. The expense of flushing is about \$70, making a maintenance charge of about \$23 per month per well, based on four flushings a year. This should give a nineteen million gallon supply. Each new well sunk diminishes the flow from the other wells so that a limit is reached where no other wells in a certain area can be sunk profitably. The present area from which the supply is taken is about one-quarter of a square mile in extent, and the economical limit of quantity from which it would be impracticable to go is in the neighborhood of from twenty-five to thirty million gallons a day. The limit of supply will be reached in about five years. In the design for the present pumping



plant, an additional pumping engine of 15,000,000 gallons was provided, and this, with the limit of the number of wells, would bring the present station to its ultimate capacity.

#### AN AUXILIARY PLANT PROPOSED

It has been proposed to install an auxiliary air-lift plant with wells at some distance from the present one, and to be used only occasionally to keep up the supply in the reservoir. The cost of this plant is estimated by the engineers to be as follows: A reservoir of 10,000,000 gallons capacity, lined with concrete and covered with concrete and expanded metal, with sewers, piping, etc., \$87,500; twelve ten-inch wells and piping, \$42,000; mains to wet wells and reservoir, \$30,000; two air compressors, \$25,000; a 15,000,000 gallon pump, \$65,000; boilers, engines, motors, etc., \$42,500; 15 per cent. for engineering and contingencies, \$43,800, giving a total cost of \$335,800. If the plant were operated by steam, it would cost \$15,000 less. For increasing the output of the present plant by a new pump, thirty wells, etc., the cost would approximate \$225,112. This would bring the present plant up to its limit of capacity. Four miles from the present plant it would be safe to place the auxiliary, but a longer distance is preferred by the experts. Other stations could be installed as the needs of the city dictated, and, if separated considerably, could be almost unlimited in number. The estimated cost of subsequent stations is placed at \$856,750.

#### MIGHT USE THE RIVER WATER

In considering a supply from the Mississippi River, the experts kept in mind the questions of cost and of the location of the intake so that there would be no danger of polluting the supply. As the river banks immediately above the city were very unstable, the cost of building a plant there would be too great and the growth of the city would render uncertain a pure supply. Four and one-half miles north of the city an intake could be built and the filter beds would be located about 4,000 feet back from the river. This position would ensure a supply of water free from any taint of pollution by sewage. The nearest town above Memphis is 200 miles away, and its sewage would be so diluted that no pollution would be appreciable. The supply at this place would be admirable, for the water of the Mississippi, after being allowed to settle, furnishes a good, wholesome, soft and potable fluid.

This location would add to the cost of the works on account of the long line of main to the city, and it was suggested that a situation three miles below the city be selected. This would answer for some years to come, but with the growth of the city and the extension of the sewers, the time would arrive when objection would be made to the water. The engineers do not consider this situation as good as that above the city. After the water had passed through the filters, however, the objection to it could be only on sentimental grounds, but even these should be respected. The Mississippi water settles rapidly, the suspended matter being principally fine sand and silt. Twenty-four hours is a safe length of time for clearing the water. The addi-

tional cost of filtration to be added to the cost of pumping into distributing mains, is estimated at \$5 per million gallons, or one-half a cent per thousand.

The intake necessary for either of these locations would be a cylinder thirty feet in diameter, the bottom to be five feet below the lowest water and the top to extend above high water. The sedimentation basin would have a capacity of 30,000,000 gallons. There would be eight filters, each with a capacity of over 3,250,000 gallons, and the pure water well would be located in the rear of the filter beds and would be 100 feet by ten feet deep. The pumps would be operated by electric motors run by a current from a generator at the station. The approximate cost of this station is placed at \$741,000, including two 15,000,000 gallon high duty pumping engines, generators, eight boilers, filter beds, etc. To this must be added \$220,000 for a thirty-six inch main to the city and \$1,500,000 for distributing mains, making a total cost of \$2,461,000. If the plant were placed below the city, the difference in cost of the thirty-six inch main would be about \$80,000.

#### ARTESIAN SUPPLY FAVORED

It has been shown that 25,000,000 gallons per day can be secured from one station and that an indefinite supply can be had by increasing the stations. The chief expense of the artesian supply is in maintenance and depreciation of wells, or about \$4 per million gallons on a basis of 300,000 gallons per day per well. The expense for slow sand filtration above ordinary pumping expense, which is higher than for the artesian system, is estimated at \$5 per million gallons. This difference of \$1 in cost and the excellent sanitary conditions brought about by the artesian water are in favor of that system.

#### METERS TO PREVENT WASTE

The engineers took up the subject of the necessary water consumption and stated that the average legitimate consumption of all the cities in the United States, allowing a small amount for leakage of fixtures, was about seventy gallons per capita. If the consumption of a city varies greatly with this average there is generally some well-defined local reason or excessive waste. In Memphis, taking into consideration all the local conditions, the average legitimate consumption per day per capita is about seventy gallons without waste. On account of the old iron service pipes, the leakage that is unavoidable amounts to about 7.5 gallons per capita a day. The remaining waste of thirty-seven gallons per capita is accounted for in flushing wells, flush tanks in the sewers and on consumers' premises. The greater part of this waste can and should be prevented. To do this the experts recommend that meters be ordered and all calculations were based on their installation. These meters form the most efficient method of preventing undue waste by the consumer.

The experts placed the value of the present plant of the water company at \$2,015,894, to which is added \$60,000 for the company's land. To duplicate the present plant would cost about \$2,402,164.

## THE UNIQUE CITY OF DALNY

At present there is being founded on the shores of the Pacific Ocean in Siberia, the Russian city of Dalny. This city will form the terminus of the new Siberian and Manchurian railway, and its site has heretofore been known as Talienswan.

The unique thing about this new city is that it begins its municipal life with all modern improvements. There are piers of stone and cement; a large breakwater, with no ships to seek refuge behind it. The streets are graded and paved, although there is no traffic for them as yet. The different quarters of the town have been laid out, space provided for parks, schools, churches, etc. Gardeners are already beautifying the parks. Electric lights and electric railways are already in operation. As yet not a foot of land has been sold, although over \$6,000,000 have been expended for improvements and public buildings. The population now exceeds 50,000, 23,000 of which are employed in building the railroad which is to be owned by the Russian Government. It is calculated that the city will cost \$18,000,000 before the present plans are completed. It is provided that when lands are sold taxation will begin and the city's government will be placed in the hands of a council, elected by the taxpayers, of which two members must be Russian subjects and not

more than two Chinese or Japanese. The port will be an absolutely free one, as the government wishes to encourage trade.

Under the terms of which all land must be purchased or leased, any lot may be held subject to the annual payment of five per cent. of its nominal purchase price. Chinese will be allowed to own land in the European city, but must erect their buildings in European style and according to modern sanitary regulations. The basic price for lots ranges from \$1.88 to \$4.70 in gold, per arshine (5.44 sq. ft.)

When a man sells a lot his deed is surrendered to the Mayor, who issues an entirely new one under the same conditions. After a period of two years lots must be improved with buildings costing certain sums of money and failure to improve according to the fixed standard will result in the forfeiture of the lot. While purchasers can sub-divide lots, no separate parcel of land shall contain less than 540 square yards. Lots for schools, churches and public purposes generally, will be donated by the city. The space between the building line and the street must not be encroached upon by the owner, but must be kept in good order by the same; it must also be fenced. The Russian Government will not release entire control of this city, for the Mayor will be appointed by the St. Petersburg authorities.



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### Smoke Prevention Devices

THE prolonged anthracite coal strike furnishes an excuse for the present extensive use of soft coal, including cities where its use has been practically prohibited. The resultant smoke nuisance has precipitated the discussion of the merits of the various smoke-prevention or smoke-consuming devices. Is it possible to eliminate the smoke nuisance by the use of certain devices, such as patent stokers and furnaces? Can the use of such apparatus be enforced without injustice to the manufacturer? We are prepared to answer both questions in the affirmative.

The efficiency of the down-draught furnace, one of the several types of smoke-prevention devices, can be proven to the satisfaction of any reasonable person by the view from our office window. For instance, there are several office buildings within sight whose chimneys have been pouring forth volumes of dense, black smoke for the past two months, or since their supply of anthracite coal became exhausted. The furnaces in these buildings were built for the use of hard coal with no provision for smoke prevention in case soft coal were used. Consequently, the smoke nuisance has become almost intolerable in New York. There is one public building, however,—the Government Post Office—which has always burned soft coal and has never become a nuisance, because its furnace was originally fitted with an attachment for preventing the smoke nuisance.

Many manufacturing firms voluntarily use, for instance, a patent stoker, which also prevents the smoke nuisance, from a matter of economy. It is estimated that an able fireman will not shovel more than ten tons of coal in twelve hours, or about sufficient for 450 boiler horse power. If a mechanical stoker is used one man can take care of two units of 500 horse power each, while if the coal were fed into the hoppers automatically he could take care of four such units, or 2,000 horse power. It will be readily seen that the cost of labor would thus be reduced in the proportion of 450 to 2,000, or about three-quarters, one man being able to do the work formerly requiring four. It is also stated on good authority that it takes less than one-tenth the time to clean a fire under a mechanically fired boiler than it does to perform similar work under a hand-fired furnace.

Mr. William Wallace Christie, in a recent article in the *Engineering Magazine*, upon the economy of mechanical stoking remarks: "Uniformity in condition of fires is doubtless best secured by the continuation processes of automatic firing, and it is doubtless true that

mechanical stokers give the best results with a fairly uniform rate of combustion, involving a regular thickness of fire and a uniform pull of chimney draught. Considering the ability to use any kind of fuel, it must be admitted that a mechanical stoker is a most desirable addition to many power plants where very low grades of fuel are burned, and where labor conditions sometimes compel sudden changes in the character of the fuel supply. Diminished production of smoke is the necessary result of uniform firing, and so far as this condition is complied with the mechanical stoker may be regarded as a means toward the abatement of the smoke nuisance. At the same time it must be understood that smoke production is the result of imperfect combustion, and that mechanical stokers are not smokeless when hard pushed."

In regard to foreign conditions Mr. Christie says, "With regard to the smoke prevention fuel of mechanical stokers, probably the most desirable and important results available are those obtained from the work of the Paris Smoke Prevention Commission. Out of 110 devices examined, the greatest amount of smoke was produced by the furnaces equipped with an ordinary hand-fired grate, while the least smoke was emitted from a patent stoker. As a result of extended investigation Mr. W. H. Bryan states that the comparative amount of smoke emitted from ordinary boiler furnaces may be taken at 46.52 per cent., and from improved mechanically-fired furnaces as 9.45 per cent., on a color scale on which absolute black is 100 per cent."

"Apart from considerations of economy and of smoke prevention," said Mr. Christie in conclusion, "the introduction of the mechanical stoker is to be advocated for the reason that it supersedes one of the most fatiguing and difficult kinds of work which has been undertaken by human effort. Even in land installation the work of firing boilers is hard and dirty, while on ship board it has long been considered the heaviest and most exhaustive work which can be performed. Of all labor saving machinery, that which relieves human beings from the stoking of boilers should be welcome, even if no commercial advantages should result."

A careful survey of the civic field reveals the fact that very little progress has been made toward eliminating the smoke nuisance from American cities despite the fact that these devices have been invented to prevent it. Pittsburgh and Cincinnati are notoriously the most vile cities in this respect of any in the country, Cleveland coming in a close third. Most of the other large cities, and not a few of the smaller ones, are more or less afflicted with the soot and smoke from the manufactories. Until this recent coal strike New York had never suffered from the nuisance to any large degree, but this has been due to the thorough inspection and enforcement of an ordinance prohibiting the use of soft coal. If it had not been for this, New York city would have been as badly off as Pittsburgh and Cincinnati.

Two years ago the city of Cleveland established a bureau of smoke inspection with the earnest purpose of abating the smoke nuisance. In our November issue of last year we gave a description of the work in Cleveland as conducted under the supervision of Prof. C. H. Benjamin, and while Cleveland has not been converted into a model city in this regard, yet a great improvement is noticeable. For example, a total of forty modern blocks within a radius of a quarter of a mile in the business centre, more than three-quarters are now provided with smokeless furnaces, and out of a total of something over 1,600 boilers in the manufacturing district about half that number have been fitted with smoke-consumers. Furthermore, such a deep impression was made upon the officers of the leading railway systems running into Cleveland by the enforcement of the ordinance relative to smoke nuisance, that this particular feature has been practically abated. It is due to the railway officials to state that after the first enforcement of the ordinance as applied them, they heartily co-operated with Prof. Benjamin in his work, and as a result, reported a saving in fuel amounting to from ten to fifteen per cent.

In the city of Washington the abatement of the smoke nuisance comes under the supervision of the health officer, Dr. W. A. Woodward, who has handled the crusade so vigorously that he has been even more successful than Cleveland. Upon this subject he said, in a recent communication, "The decision of the Court of Appeals sustaining the act of Congress empowering the Health Department to enforce the regulations relative to the supervision of the smoke nuisance within the city limits, has sustained in every instance the



decision of the lower courts. It is understood that one will be taken to the Supreme Court of the United States, and there is very little doubt that the decision of the highest court in the land will sustain that of the lower." Dr. Woodward keeps a number of inspectors constantly employed in search of violations of the law and fines are not of infrequent occurrence. These drastic measures have had a salutary influence upon would-be offenders of the law.

The latest crusade to be inaugurated is in Chicago. Here an ordinance has been passed which creates a new department to be known as the Department for the Inspection of Steam Boilers and Steam Plants. Its staff will consist of the city boiler inspector, the city smoke inspector, and a supervising mechanical engineer. This board will make inspections and prosecute all offenders of the ordinances. The provision which promises to be of the greatest benefit is that relating to certain building restrictions. For instance, a permit will not be issued if the plans show that no provision has been made for a smoke prevention device. This applies not only to new buildings, but to those which are to be overhauled. Any violation of this rule will be punishable by a fine of twenty-five dollars per day, imposed upon the person who reconstructs the building without first securing a permit in connection with this feature. There will be no attempt to dictate as to what kind of a smoke prevention device shall be installed, but the owner will be held responsible for the result. Boilers are to be inspected every year, with the exception of low pressure boilers, the fees for inspection being from three to five dollars for boilers and one dollar for tanks and jacket kettles.

Every city should have a bureau of smoke inspection and so take a step toward placing American municipalities on an equal footing with those across the Atlantic.

### The Asphalt Trust Situation

It seems exceedingly difficult to bring about a settlement of the affairs of the now notorious asphalt trust. The public is no sooner informed that an amicable solution of the difficulties has been reached than it is treated to a counter statement describing the action of some dissatisfied stockholder. The latest revelation is connected with a suit filed in the United States Circuit Court by Williamson Bullet of Philadelphia, the primary object of which is to have the receivers of the National Asphalt Company and the Asphalt Company of America instructed by the Court to bring suit against the stockholders of the America Company to recover \$24,000,000 of assessments on their stock.

Mr. Bullet has brought suit for himself and others as holders of collateral certificates of the America Company. His petition is a long one and arrays numerous charges of fraud in connection with the promotion, first, of the Asphalt Company of America, and subsequently of the National Asphalt Company. Specifically, Mr. Bullet charges that when the Asphalt Company of America absorbed the Barber Asphalt Company and other concerns exorbitant prices were paid for the property acquired.

When the Asphalt Company of America was acquired by the National Asphalt Company, the holders of stock in the former company in return for their surrender of that stock received certain securities of the latter company. This, Mr. Bullet charges, was a fraudulent plan to relieve the stockholders of the Asphalt Company of America from paying the installments due on their capital stock, and worked injury to the security holders of the Asphalt Company of America.

Mr. Bullet also charges misrepresentations in statements issued, and asks that the directors and officers of the two companies be included as defendants in the suit which he asks that the receivers be directed to bring. He also asks to have the carrying out of the proposed plan of reorganization of the ten companies stopped by injunction until after the receivers have made investigation along the lines of his petition.

It seems as if the troubles incident to the collapse of the asphalt bubble will never end. One thing is certain, however, and that is they will not be settled until they are settled right. The reorganized trust, in order to regain its lost prestige, has been taking contracts at ruinously low prices. It is possible that the cities receiving these bids

may be the gainers but we doubt very much the wisdom of any city receiving the bid of any contractor for a pavement at lower than a reasonable price. As we have asserted many times before, paving companies should not be expected to do something for nothing and it is false economy to endeavor to beat them down to the lowest possible figure. City engineers are paid for making careful estimates of the cost of pavements prior to the advertising for bids, and as local conditions differ widely, it seems to us only fair that the price for any pavement should be equitably adjusted by the city engineer and the contractor so that neither the city will be obliged to pay too much for the contractor obliged to perform his work for too small a profit.

### Auxiliary Telegraph for New York

MAYOR Low proposes to enlarge the fire alarm telegraph system of Greater New York by the purchase of the auxiliary system which has been carried on for five or six years by the Manhattan Fire Alarm Company. This action is brought about through the revocation of the company's permit to extend its business within the city limits, by Fire Commissioner Sturgis last May. The company appealed from the decision of Fire Commissioner Sturgis to Mayor Low, and in announcing his decision the Mayor said: "I have informed the company I sustain the Fire Commissioner in his action in revoking its permit."

"In view of the fact, this decision affects injuriously a large investment made upon the faith of the city's permit, although that permit was revocable by its terms; and, in view of the further fact, the device controlled by this company is valued by many as an additional protection on their premises against fire, I have suggested the city might be willing to enter into negotiations for the purchase of the company's plant with a view to the city's giving this protection itself. The company has informed me that it will confer with me on the basis of my suggestion."

"Before any action is taken the subject will require careful consideration, and, eventually, legislation, in order to make my suggestion practicable. If, after consideration, this plan appears to the city to be wise, it can then be carried out. In the meantime, the whole subject will be investigated carefully."

This is a wise move on the part of Mayor Low. No better testimony as to the efficiency of this auxiliary service can be given, when the evidence and history of the case are taken into consideration, than is found in the suggestion of Mayor Low that the city purchase the plant. The usefulness of the auxiliary fire alarm system is unquestioned; its need and efficiency have been often demonstrated. Moreover it should be extended, by compulsion if necessary, until it includes every tenement and apartment house, office building and hotel, public building and manufactory in Greater New York.

The vital test of any fire department is in its fire alarm system. No matter how much apparatus, or how many trained men a department may have, if the fire is not located, the service is useless. It is the first five minutes of a fire which determines the result, therefore too great an effort cannot be made to secure an immediate location of the fire. In a crowded city like New York there is more than ordinary urgency for a perfect fire alarm service, and that the present system is imperfect and inadequate cannot be denied. It has many antiquated fire boxes and other apparatus in service which should be replaced by the more modern and approved devices. If a reasonable price can be agreed upon, by all means let the city purchase the plant of the auxiliary company and perfect its system by extending the fire alarm service to every important building within the city limits. Mayor Low will deserve the commendation of the entire community if he succeeds in thus increasing the efficiency of the fire department.

The real test of a municipal administration is found in the results and not in promises made either before or after election. That mayor who can bring things to pass after his election and keeps his pledges is most effective.

## EDITORIAL COMMENT

Trolley car accidents, caused by weak brakes, have been a frequent occurrence this season. The recent collision on one of the New England lines in which several lives were sacrificed, upon investigation showed that the brakes in service on the heavy cars were inadequate, and air brakes were recommended.

Asphalt pavement is being laid at phenomenally low prices this season, which is probably due to sharp competition. Cheap pavements do not necessarily mean economy. The city should pay a fair price for any kind of pavement and not attempt to "Jew" a contractor down. As fair price is sure to yield better results in the long run.

We call particular attention to the papers read before the League of American Municipalities at Grand Rapids last month, which appear in this number. Others will follow in subsequent issues. The paper by Dr. Bayles on "Gas Leakage," is exceedingly valuable, as he is the most noted expert in this field. He makes some astonishing revelations.

Health Officer Friedrich, of Cleveland, has commenced a war against the use of dirty money in that city, claiming that many cases of smallpox and other contagious diseases can be directly traced to its circulation. We believe he is right in his contention, and there is abundant proof to be found elsewhere to corroborate his statement. Happily for Cleveland, the banks and stores are co-operating with the health officer and giving out and using only new, clean bills. We believe that many lives would be saved annually if every municipality would follow Cleveland's example.

Director of Road Enquiries Martin Dodge, of Washington, believes in the usefulness of the American Road Makers. In writing to the Secretary about it he said: "I have received numerous letters from persons in the west who have read of the formation of this association and who say, if it should succeed in its object of joining the capitals of the various states together by a system of highways, that the counties of those states would take favorable action toward connecting all the county seats, and to make a network of highways joining not only the capitals of the states, but also the county seats."

The best of administrations, entertaining the best of intentions, will inevitably make blunders, but there would have to be something more than "extenuating circumstances" to overlook such a blunder as would be made in the removal of Chief Croker, of the Fire Department. We believe, with our esteemed contemporary, *The Sun*, that, "The city and the people of the city may have had in an important post a servant more thoroughly representative of reform ideas than Edward F. Croker, now relieved from duty without charges against him; but, if so, we do not recall that servant's name. Commissioner Sturgis should have the grace to let as good an official as Chief Croker alone, even if he happens to bear the same name as the leader of Tammany Hall."

The city of Orange, N. J., is blessed with a progressive Board of Health. It has recently secured the passage of an ordinance requiring all barbers to wash brushes, combs, razors, cups and tools in boiling water before beginning business. Each operator is required also to sterilize his tools in an antiseptic bath after serving a patron. Another ordinance has been passed requiring saloon and restaurant keepers to wash thoroughly in water which has been used for no other purpose, every glass or drinking vessel before serving a drink. To make these ordinances effective a penalty of \$10 has been fixed for every violation, and the Board proposes to have inspectors constantly at work to see that the provisions are obeyed. We can do no less than urge the adoption of similar ordinances in other cities.

The American Society of Municipal Improvements will hold its next annual session in the city of Rochester, N. Y., the 7th, 8th and 9th of October next. It is too early to even give a forecast of the

program, but we are assured by President Fisher, of Rochester, and Secretary Tillson, of Brooklyn, that greater interest than ever is manifested among its members and that the membership is increasing at a gratifying rate. The attendance promises to be the largest in its history. This society is a year older than the League of American Municipalities and has much the same object for existence—the betterment of cities by the discussion of its problems in convention and with one another by correspondence. Full particulars will be given in the October issue and, if in the meantime, any of our readers wish additional information about the society, they can communicate with President E. A. Fisher, City Hall, Rochester, or Secretary George W. Tillson, Municipal Building, Brooklyn, N. Y.

In the United States and Canada last year \$165,000,000 in property went up in smoke. This is one of the instances where it is not a credit to lead the world. We have the best trained, and in many respects the best equipped, fire departments, but there are many improvements yet to be made, and the annual ash-heap must be reduced in size. Perhaps the greatest need at the present time is a more liberal employment of fire detecting devices. As a rule the fire alarm systems of most of our large cities are of modern pattern, but there is too little use of what is known as "fire detecting wires." Thermostats are used to good advantage on ceilings, and the fire detecting wire can be readily placed in various parts of all the rooms of a building and at comparatively slight expense. It does not mar the appearance of the decorations and is never in the way, but it is one of the most faithful and efficient means for detecting the presence of fire yet invented. It never sleeps; it never tires of its watch; it never fails to perform its duty. Locating the thermostat on the ceiling and running the wire around the heating apparatus, waste barrels, store rooms, waiter shafts, closets, gas jets, etc., where it would be impracticable to place a thermostat, forms a happy combination and reduces the fire risk to the minimum. But it will be readily apprehended that the wire, which is placed all around a room is sure to detect a fire more quickly than the thermostat which is located at one point only, and so gives to the fire department the advantage which it covets in order to successfully cope with any fire. Former Chief Bonner is quoted as saying "Acquaint me of a fire within the first five minutes and I will put it out in the next ten minutes. If it burns five minutes before the alarm is received I do not know how long it will require to put it out."

## LETTERS TO THE EDITOR

### Current Usage in Sewer Assessments

—, N. J., Aug. 1, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

With reference to information asked for by Mr. Augustus W. Mithoff regarding methods of sewerage assessment in current use, I beg to send under other cover a paper containing some data acquired by me a short time ago on this point, which may be of interest.

KENNETH ALLEN, *Engineer and Superintendent.*

The paper referred to is of such general interest that the following digest is given:

In summing up Mr. Allen expresses the belief that: 1. for Storm Drains assessment should be levied on a basis of area; 2. for Separate Sewers assessment should be levied on a basis of water consumption, estimated either (a) by meter record; (b) by a percentage of the water rental; (c) by the mean consumption per capita, or (d) by a combination of frontage and area with an estimate of the water used; 3. for Combined Sewers assessment should be based both on area and water consumption.

In the application of a system of assessment, property that cannot avail itself of connection or is incapable of receiving benefit should be exempt; no area should be assessed twice, and corner lots should not be assessed for the entire frontage on both streets. Deductions from rentals based on water consumption should be made where the water is not discharged to the sewer—as when used for sprinkling, or when discharged to natural water courses or private drains.



The assessment may be made once for all, or it may be paid in a number of installments. By the first method the collection may be in the form of an entrance fee, but this is not believed judicious, as exempting vacant property and placing the burden on those who avail themselves of connection with the system. Unless connection is made compulsory an entrance fee retards the full use of the system.

Installments may cover the cost of construction, with interest, and be payable annually for a term of five, ten or fifteen years; or they may take the form of a perpetual sewer rental, covering all annual expenses of interest, sinking fund, operation and renewals.

Sewers, if well built, are nearly indestructible, and a large part of their cost may fairly be paid by posterity; but it would probably be unwise not to provide a sinking fund for the redemption of their cost in from thirty to fifty years at most, especially if the sewers are subject to much erosion, or if the system includes pumping machinery.

In Marlborough, Mass., half the cost of sewerage is met by an annual rental based on water consumed, the other half being paid by a general tax. In Brockton, Mass., a similar charge is based on water consumed, area and frontage. In Boston an ordinance was passed and put in force by which the expenses of maintenance and operation were met by a general appropriation of \$350,000, one-fourth of which was assessed on all estates in the city on a basis of valuation, while the remaining three-fourths was raised by a direct assessment, based on the water tax, amounting to about 20 per cent. thereof. The cost of constructing main drainage and other important works of a general character, with sinking fund and interest charges on thirty-year bonds, was assessed on all estates according to their valuation. District sewers were assessed by area on the district drained. Laterals were assessed by frontage at a rate of \$1.25 per foot, any deficit or surplus being made good by, or reverting to, the area of the district, as the case might be.

Although declared legal for other towns of the state, this method was not sanctioned by the courts, for the city of Boston, which was therefore obliged to abandon it.

The Sewerage Commission of the city of Baltimore, in planning a general system of separate sewers for the entire city, suggested the following plan:

The network of lateral sewers or "reticulation system," to cost in the neighborhood of \$4,580,000, would be paid for as constructed by a uniform frontage tax on abutting property estimated to cover the actual mean cost per lineal foot. This would probably not exceed \$1.25 per front foot.

The district mains, interceptors, pumping station, outfall and disposal works costing from \$5,600,000 to \$9,900,000, would be paid for by the proceeds from 3½ per cent. bonds, running fifty years. The annual charges for interest, sinking fund, and operation, would be met by a sewer rental, decreasing from an average of about \$5.00 per house at first installation to \$1.00 or less at maturity of bonds.

The following table, compiled from data collected by the writer, indicates the prevalence of certain methods of assessment in force in different sections of the country:

	New England.	Middle States.	Southern States.	Northern Central States.	Western States.	Canada.	Total.
Total No. of Cities.....	37	34	27	36	15	2	151
Frontage .....	8	8	7	18	4	1	46
Area .....	4	2	3	8	2	—	19
Rental .....	1	—	—	—	—	—	1
Valuation .....	1	—	1	—	2	—	4
Entrance fee .....	7	1	—	1	—	—	9
Frontage and area.....	6	7	—	—	2	—	15
Frontage area and rental ...	2	—	—	—	—	—	2
Frontage area and valuation —	—	3	—	—	—	—	3
Rooms in dwelling.....	—	—	1	—	—	—	1
All cost paid by city.....	3	4	14	—	2	—	23

#### PRACTICE IN OTHER TOWNS AND CITIES

ASHTABULA, O.—The entire cost of construction, except for street intersections, one-fiftieth of the entire cost and corner exemptions, is assessed on the abutting property. Corner lots having a

sewer along one side are exempt for 100 feet along the other side. The Y branches only are figured in with the original cost, the property owner pays for his own laterals.

BRYAN, O.—Expense is variously divided. Sometimes the property owners furnish sewer tile and the corporation lays them, at others the corporation digs three feet of the trench and the owner does the rest. At present the Council digs two and one-half feet of the trench and the property owner finishes.

BUFFALO, N. Y.—The entire cost of all sewers is assessed directly upon the property benefited. The cost of a trunk sewer is spread over the entire district it drains.

CINCINNATI, O.—The cost of sewers in excess of \$2 per abutting foot assessed on property on both sides of the street, is paid out of the Trunk Sewer Fund which is provided by a tax of 4/10 of a mill on the tax duplicate.

CLEVELAND, O.—The foot frontage is assessed at the rate of \$2 per foot, which is equivalent to the cost of a local sewer. The cost above this \$2 is placed upon districts, the city being divided into sewer districts according to drainage.

DAYTON, O.—The cost of main and lateral sanitary sewers is assessed on the property owners according to benefits. Storm water sewers are paid for by the city from a tax levied for that purpose.

DELPHOS, O.—The cost of laying sewers is equally divided between the city and property owners.

EAST LIVERPOOL, O.—The property owners pay the entire cost of the sewers as well as of all outlets. The cost of \$1 per foot has been considered sufficient to pay the total cost and this is payable within thirty days from the laying of the sewer. If not paid then, it is due in five annual installments with interest.

ELYRIA, O.—The cost of local sewers is apportioned according to the benefits, and these are determined by a committee of three free holders. They decide what percentage the city is to pay which is from 2 to 50 per cent. The front foot assessment has been used lately but the policy is not settled.

FINDLAY, O.—The city is divided into districts. Two per cent. of the cost and all street and alley crossings are assessed as a tax on the district and the balance on the abutting property. The city at large pays nothing.

GALION, O.—The city pays for all street and alley intersections and the abutting property the balance of the cost.

GALLIPOLIS, O.—The sewers were put in with the paving improvements in order to evade some peculiar provisions of the laws. The abutting property owners pay one-half and the city the rest of the cost of the improvements.

HAMILTON, O.—The cost of the sanitary sewers is assessed on the abutting property less the corner lot exemptions. The storm or drainage sewers are paid for by the city at large, the city being divided into two sewer districts.

LIMA, O.—The cost of all sewers, both trunk and lateral, is paid out of a general levy.

LOUISVILLE, Ky.—Trunk and lateral sewers are paid by the city out of a yearly tax levy.

MANSFIELD, O.—The cost of trunk sewers is met by the property owners, each being assessed according to the valuation of his property. Laterals are paid for by abutting property owners except for street and alley connections, which the city pays.

MARION, O.—The city pays 2 per cent. of the entire cost of sewers and for the street and alley connections. The abutting property owners pay the balance.

NEW HAVEN, CONN.—In 1871 when the sewer system was designed, the total cost of the system complete was divided into three parts, one of which was paid by the city and the rest by the abutters. The total length of streets in the city was used to determine the share of the abutters and \$1.75 was obtained as the cost per linear foot to be paid by them. Exemptions are made on corner lots and in cases of especially shallow lots or lots that could not in any way be benefited. The theory was that the benefit to abutters was independent of the size of the sewer. Under the State law, sewers cannot be assessed according to an arbitrary rule, but the Board of Arbitration must find that the property is benefited to the extent of the assessment made.

NILES, O.—The abutting property owners pay 49/50 of the cost of all sewers, and the city the balance. If the assessed value of the property is not high enough to stand the amount, the city pays the difference. Cities in Ohio are allowed to assess only 25 per cent. of the value of realty.

NORWALK, O.—The city pays one-third the cost of sewers and the property owners the balance.

NORWOOD, O.—The sewers are divided into districts and the entire cost is assessed against abutting property on the foot front basis irrespective of the size of the sewer or its character. The assessment per front foot has varied from 55½ to 88 2/5 cents. The separate system of sewers is used.

PROVIDENCE, R. I.—When the rates were adopted it was estimated that the property abutting would be assessed 60 per cent. and the city the rest. The actual cost to owners will not exceed 45 per cent. The rates of assessment is 60 cents per linear foot for frontage and 1 cent per square foot for area back for 150 feet.

SALEM, O.—The abutting property usually pay the entire cost of sewers. If the cost assessed exceeds 25 per cent. of the property value, the owners pay only 25 per cent. of the tax valuation. A trunk sewer recently constructed was paid for by assessing property drained by sewer according to benefits.

SIDNEY, O.—The entire sewer system was installed by the city. Property owners need not use it, but those doing so must pay for the lateral from the house to the sewer.

STEUBENVILLE, O.—The city pays entire cost of sewers and abutting property is assessed \$2 per foot, the city paying the difference.

WARREN, O.—The cost of trunk sewers is assessed on abutting property upon the cost basis of a 12-inch sewer; all expense above that is apportioned to the entire sewer district. Lateral sewers are assessed directly on abutting property according to benefits.

WORCESTER, MASS.—Assessments for sewers are based on the cost of the work, due consideration being given to the benefit. On inexpensive work, the abutters pay the entire cost, but where the cost is high, the city bears a portion, which is determined by a committee appointed for that purpose. Commonly, one-fourth the expense is paid by the city and the balance by the abutters.

### Another Makes Good Use of Book-typewriter

KOKOMO, Ind., Aug. 23, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

In reference to the use of the book-typewriter, referred to in this month's issue of the MUNICIPAL JOURNAL AND ENGINEER, I will say, that I began the use of an Elliott and Hatch Book-Typewriter in October, 1900, and have used it continuously since that time for all records, such as council proceedings, resolution records, ordinance records, city commissioners' records and tax duplicate, together with any other work that can be done on any of the standard typewriters, such as transcripts, (3 to 5 carbon copies at each time), improvement specifications, notices of all kinds, copy for printer, tax deeds, cer-

tificates of tax sales, and in fact all of the work done in the city clerk's office since the installation of the machine, except claim docket, journal, register of city orders and ledger.

I have succeeded in condensing council records to such an extent that the proceedings for six years, (two meetings in each month and allowing six pages for each meeting) may be recorded in a book of 580 pages, and the same result will obtain as to other records, thereby saving to the city, not only "book expense," but additional vault and storage construction.

The machine I am using cost the city \$175.00, and has not had one penny spent in repairs upon it during the entire use of it; the machine is in good condition and will continue to do the work required during the balance of my term of office, which is two years.

In addition to the work outlined, I may add that all of the work is done in this office without an assistant.

I can truthfully say that all offices, whether county or city, where records are being made, should be supplied with an Elliott and Hatch Book-Typewriter, for reasons too numerous to mention.

CHAS. R. FORD, City Clerk.

### Convention Dates

#### SEPTEMBER

The convention and tournament of the Iowa State Firemen's Association will be held at Davenport, Ia., September 1-4. H. Horan, secretary, Muscatine, Ia.

The annual convention of the New Jersey State Firemen's Association meets at Atlantic City, September 10. William Exall, secretary, Newark, N. J.

The Vermont State Firemen's Association will meet at St. Albans, Vt., September 11. E. D. Moore, Bennington.

The fifth convention of the National Firemen's Association meets at Detroit, Mich., September 11-12. D. W. Gillen, secretary, 176 E. Monroe street, Chicago, Ill.

The Union of Canadian Municipalities will hold its second annual meeting at Montreal, September 15-17. Hon. W. D. Lighthall, secretary-treasurer, Westmount, Canada.

The Association of Chiefs of Police of the Pacific Slope will meet at Portland, Ore., September 16. Chief Hodgkins, Oakland, Cal.

The International Association of Fire Engineers will hold its convention at New York City on September 16-19. Henry A. Hill, secretary, Wyoming, O.

American Civic Improvement League will meet at St. Paul, Minn., September 24-26. E. G. Rontzahn, Dayton, O.

The New Hampshire State Firemen's Association will meet in convention at Manchester, September 26. G. L. Osgood, secretary, Concord.

The New England Water Works Association meets at Boston, Mass., in September.

#### OCTOBER

The International Association of Municipal Electricians holds its seventh convention at Richmond, Va., October 7-9. E. P. Foster, secretary, Corning, N. Y.

The twenty-third convention of the Pennsylvania State Firemen's Association meets at Bradford, Pa., October 7-10. W. W. Wunder, secretary, Reading, Pa.

The annual convention of the American Society of Municipal Improvement will be held on October 7-10 at Rochester, N. Y. E. A. Fisher, president, Rochester, N. Y.

The Pacific Coast Fire Chiefs Association will meet at Victoria, B. C., October 7-10. H. W. Bringham, Seattle, Wash.

The American Street Railway Association will meet at Detroit, Mich., October 8-10. T. C. Penington, 2020 State street, Chicago, Ill.

The Mayors of Georgia will convene at Atlanta on October 14-15.

The Massachusetts Firemen's Association will meet at Boston, October 15-17. D. Arthur Burt, secretary, Taunton, Mass.

#### DECEMBER

The thirteenth annual meeting of the American Health Association will be held at New Orleans, La., December 8-12. Dr. Chas. O. Probst, secretary, Columbus, O.



## Personalities

—Mayor Joseph F. Moore of Jeanerette, La., has resigned.

—The Order of the Legion of Honor, France, has appointed Geo. P. A. Collins, of Boston, Mass., an officer of the Legion, and Mayor Paul Capdeville of New Orleans, La., a chevalier in the Legion.

—We regret to learn that Mayor Samuel M. Jones of Toledo, Ohio, has been so ill that he has been compelled to leave the city for the purpose of seeking entire rest. We trust that His Honor will soon recover his health.

—Mayor A. A. Ames of Minneapolis, Minn., tendered his resignation to the Council to take effect August 27th. Mayor Ames was at West Barton, Ind., when he took this step. Alderman D. Percy Jones has been Acting Mayor during Ex-Mayor Ames' absence.

—Mayor Studley of New Haven, Conn., recently gave an informal dinner to Mayors Sullivan of Hartford and Charters of Ansonia. The three gentlemen exchanged ideas on municipal affairs, but it was claimed that no political significance could be attached to the meeting.

—The Acting Governor of Connecticut has appointed Hon. Charles Peix, Jr., Mayor of Danbury, a county commissioner. There is nothing to prevent the Mayor holding the two positions and he has stated that he will serve both the county and the city to the best of his ability.

—A recent decision of the Supreme Court of Minnesota holds that the election of Mayor Hugo of Duluth, Minn., is valid. The trouble arose over the fact that the judges neglected to place their initials on some of the ballots, but this action, according to the Court, does not make them invalid.

—Mayor Frank Wright of Cape Springs, Ga., has invented a simple attachment for fly screens, which is guaranteed to quickly clear the room of flies and keep it so. The circular sent out as an advertisement for this invention is unique from the fact that it is partly written in the new style of orthography.

—Mr. Charles N. Smith has been elected to succeed Mr. A. E. Winchester as one of the electric light commissioners of South Norwalk, Conn. The Council adopted resolutions expressing its pleasure and satisfaction at the splendid success which Mr. Winchester had rendered the city in establishing an electric light plant.

—His Majesty, the Emperor of Germany, has conferred the "Order of the Red Eagle" (third class) on Mayor Ashbridge of Philadelphia, Julius Fleischman, Mayor of Cincinnati, and Rolla Wells, Mayor of St. Louis. Framed portraits of the Prince were sent to Mayor Low of New York city; Mayor Collins of Boston, and Mayor Harrison of Chicago.

—Not long since an unknown negro made a desperate effort to assassinate Mayor D. J. Bailey of Griffen, Ga. Mayor Bailey had attempted to capture a negro who had been recklessly firing his revolver in the streets and the negro turned the revolver on the Mayor as he was about to apprehend him. Fortunately his aim was poor and the Mayor escaped injury.

—The city officials of Bridgeport, Conn., who played baseball, recently journeyed to Hartford to cross bats with the team of officials from that city. They had recently trounced the office holders of Waterbury, and looked for an easy victory over the Hartford men. Their colors were lowered, however, and they returned to Bridgeport vowing to turn the tables on their Hartford friends when the return game should be played at the "Brass City."

—The death of Senator McMillan of Michigan has deprived the city of Washington of one who was practically its mayor. Senator McMillan was the chairman of the Committee of the District of Columbia, and has used his influence and business ability to further the plans for the beautifying of the city. It was he who suggested the appointment of the park commission that has made the plans for the extension of the park system of Washington.

—Mayor Hancock of Niagara Falls, N. Y., recently affronted the labor unions of the city because he vetoed a resolution appropriating money from the city funds for the celebration of Labor Day. After vetoing this resolution Mayor Hancock secured the necessary sum from among his friends and sent it to the labor committee, but it was rejected with the statement that the organized labor of the

city considered itself affronted by the Mayor's former action, and would not receive the money as a peace offering.

—The death of Alderman James G. Bridges has deprived the Fifth Ward of the Borough of Brooklyn, New York City, of its representative in the Board of Aldermen. Alderman Bridges was a native of Brooklyn and had always resided in the ward which he represented. He was a boiler maker by trade and was also a member of Hose Company No. 5 when the city was protected by volunteer firemen. The speeches of Alderman Bridges were unique in their phraseology and caused much merriment in the Board of Aldermen, but whatever he started out to accomplish he usually succeeded in doing.

—The friends of Mayor Lankering of Hoboken, N. J., feel surprised that His Honor was overlooked in the distribution of remembrances of Prince Henry's visit. The Mayor was indefatigable in his efforts to make the stay of the officers and men of the royal yacht pleasant, and in view of the fact that other officials were remembered by the Prince and his Imperial Brother, the friends of the Mayor feel that he should have been included among the number. The Mayor himself says he does not feel disappointed because what he did for the Prince and for his suite was done as Mayor of Hoboken for a guest of the nation.

## New York as a Foreign City

IN the city of New York there are only 737,477 white persons born of native parents, or but 21.4 per cent. of the population of the city. This statement means that out of every one hundred persons living within the municipal boundaries of New York seventy-eight are either foreigners, or the children of foreign-born parents, or colored people. New York, however, is not the first, but the second city of the country having the largest foreign-born population. Fall River, Mass., is first in that respect. Official figures show that there are in New York city more males under twenty-one years of Slavonic parentage than of any other people, and the number of Slavonic men more than twenty-one years of age exceeds that of any other nationality except Germans and Irish. In the Fourteenth Assembly District of New York County the percentage of Hebrew families with nine children each is six times as great as the Protestant percentage, while the number of Hebrew families with no children at all is about one-half the Protestant percentage.—Henry McMillen in *Leslie's Weekly*.

## The Water Works of Bahia

THE city of Bahia, which is situated on the coast of Brazil, South America, has a population of about 200,000 inhabitants who are housed in 17,000 dwellings. The water supply for these people has been furnished by a local company ever since 1852. It is brought from the nearby mountains, and thus far the expenditure for the works, including the pipe system, fire plugs, etc., has amounted to \$1,500,000. The supply is not adequate to the needs of the city, and for a long time negotiations have been going on between the company and the city for the purpose of increasing the supply. The monopoly has been renewed for a period of forty-five years and some valuable franchises and privileges have been awarded the company. On the expiration of this contract the city will have the option to buy the company's plant at the valuation of expert engineers. Every dwelling in Bahia must use water, and the municipal officials of the city regulate the price. For the average dwelling for 422 quarts a day, ten cents is charged; twenty-one quarts of water is furnished to the public fountains and hydrants, at a low price. The improvements contemplated by the company will cost in the neighborhood of \$600,000, but owing to the financial crises prevailing in Brazil, the company has been unable to obtain the money required to complete the water system and therefore desires to sell its plant and privileges. The price asked is \$1,100,000. It is estimated that the earning power of the water works, when completed in accordance with the new contract, will be \$300,000 a year, and the company purchasing its rights will doubtless be awarded a contract for establishing a drainage system in the city and for furnishing the houses with sanitary plumbing.

# NEWS AND PRACTICE AMONG THE CITIES

## No Reason for Smoky Chimneys—Glasgow Street Railways a Success—Water Meters Before Filtration—Proposed Charter for Los Angeles

**STREETS TO BE PAVED WITH GOLD.**—This sounds somewhat extravagant, yet it is true, nevertheless, that the streets of Reading, Cal., will be paved with quartz which is estimated to assay about \$4.00 a ton of gold. The rock is low grade quartz, and is very abundant in this locality, consequently it is cheaper to use this on the streets than to import other material from a distance.

**TOWN TWO HUNDRED AND FIFTY YEARS OLD.**—The old town of York, Me., recently celebrated its 250th anniversary of its incorporation as a town and paid tribute to her founders and men of olden times who made the town famous in history. A parade, including a number of historical floats, fireworks and speeches, made the day a memorable one. The Hon. Thomas B. Reed was one of the orators as well as Thomas Nelson Page and Mark Twain.

**MAYOR MUST PAY LICENSE FEE TO DO BUSINESS.**—Mayor Scott of Ensley, Ala., was a much surprised man when he received a notification not long since to the effect that he had not taken out his license to do business as a mayor. The county tax collector was the one who caused the surprise by writing the mayor that if the license was not taken out at once, a penalty of 10 per cent. interest would be assessed. The mayor was not aware that the heads of incorporated towns and cities were required to have licenses to do business. He wondered if, like push-cart men, he would have to keep displayed a badge with his number in order to keep from being "run in."

**VILLAGE INVESTS IN MUSICAL INSTRUMENTS.**—It is an unusual thing for a town or village to invest in a complete set of musical instruments for a band, but the village of Hammondsport, N. Y., has finally come into possession of the instruments and other paraphernalia formerly owned by the Citizen's band of that place. The members of the band became so involved by the purchase of about \$1,500 worth of instruments that, despite their endeavors, the debt could not be paid. A petition was signed by twenty-five of the citizens asking the village trustees to call a special election for the purpose of voting \$1,000 for the purchase of the instruments and thus relieve the members of the debt. The election was called, the tax voted and levied and the village became the owner of the music making apparatus.

**BARBERS AND BARKEEPERS MUST BE CLEAN.**—To prevent any possibility of contagion from barbers' implements the Orange (N. J.) Board of Health has passed an ordinance requiring all barbers to wash brushes, combs, razors, cups and tools in boiling water before beginning business. After finishing with each customer a barber, before using a razor again, must wash it in an antiseptic. The board also has adopted an ordinance requiring saloon and restaurant keepers to wash thoroughly in water which has been used for no other purpose every glass or drinking vessel before serving a drink. A penalty of \$10 is fixed for every violation of either ordinance and the board will have inspectors at work to see that the provisions are obeyed.

**A FINE WATER SUPPLY.**—The city of Jackson, Mich., receives its water supply from a series of artesian wells, twelve in number, and varying from four to six inches in diameter. The flow from the pipes is spontaneous, the water running into a reservoir at the pumping station at the rate of 7,000,000 gallons per day. If a greater quantity is needed, centrifugal and lift pumps can increase the flow to 10,000,000 gallons. It is claimed that the supply of water is nearly inexhaustible. Consumers are limited in their use of the water and sprinkling is restricted to certain hours of the day, but this is due to the insufficiency of the pumping plant. While

the water rates are not excessive, the net revenues from the water works are sufficient to pay the interest on the bonded indebtedness of the city.

**GOVERNMENT TELEPHONES IN GERMANY.**—In Germany the telephone service is carried on under the supervision of the post office department. Up to April, 1902, the cost of the entire plant amounted to about \$42,000,000, an increase of \$5,500,000 over the previous year. At the present time there are 2,024 places that have public telephone stations and the whole number of circuits consists of 322,281 miles of wire. All the stations together average about 2,205,966 conversations a day, or about \$04,000,000 per year. Of course Berlin has the greatest number of public stations. There are 51,561. Hamburg comes next with 20,823, then Frankfurt with 9,271, Dresden with 8,914, Leipzig with 8,725 and Cologne with 7,484. To handle this volume of business the services of 8,189 employees are necessary and of this number Berlin has 1,712.

**RECOMMENDS FLUSH TANKS FOR SEWERS.**—City Engineer Frederic A. Snyder of Williamsport, Pa., strongly recommends the use of flush tanks at the dead ends of sewers so arranged as to discharge once a day. This would keep the sewers in a sanitary condition. The cost of the water used is insignificant as compared with the good to be accomplished. Engineering work on improvements as compared with their cost has been variable during the last ten years running from as low as 2 per cent. in 1893 to 42 per cent. in 1890. In 1901 it was 23 per cent. Of this, 19.7 per cent. was for sewers and 5.3 per cent. for pavements. Inspection of pavements amounted to 1 per cent. of their cost. In 1901 the city paid \$1.80 per sq. yd. for laying brick paving, of which there are 82,314 sq. yds. in the city. There are 63,449 sq. yds. of asphalt.

**PROGRESSIVE BIRMINGHAM.**—The city of Birmingham, Ala., has recently completed a fine new city hall at a cost of \$200,000, and it is claimed to be the finest building of its kind in the State. The structure is an ornament to the city and is well arranged in the interior for the accommodation of the officials. Besides the officials the military companies have armory and company rooms there and the members of the central station of the fire department have sleeping quarters there also. The tax rate of Birmingham is 1 per cent., the income for the last year being \$442,338 and the expenditures \$433,881. The total taxation of property in the city amounts to 2.30 per cent., of which 1 per cent. is city, .55 county and .75 State. The city has taxable property of the assessed value of \$17,695,690, but the property is only assessed at 60 per cent. of its actual market value.

**COLUMBUS NEEDS NEW LIGHT PLANT.**—Among the numerous projects that have been undertaken by Director Immel of the Department of Public Improvements of Columbus, O., is the re-opening of the municipal electric light plant that had been closed down by his predecessor from lack of funds to run it. Notwithstanding the long period of disuse and the attendant depreciation, it was not long before it was in running order again and Director Immel claims that the cost per arc light was reduced from \$70, the amount at which the previous administration had run the arcs, to \$46 per lamp per year. The saving enabled the department to install ninety additional lamps. The Director recommends that a larger plant be put in and claims that, if this were done, the cost of operation could be further reduced by about thirty-five per cent.

**PUBLIC BATH FOR CAMDEN.**—The contract for the erection of a public bath in the city of Camden, N. J., has been awarded to Mr. Henry A. Macomb of Merchantville, as having submitted the best design of the three presented. According to Mr. Macomb's plan the bath is to cover a plot of ground 60x100 feet in dimension



The pool itself with the dressing rooms, etc., will occupy a space 91x60 feet in the rear of the lot, leaving room for a narrow building across the front for entrance, toilet, etc. It is estimated that this building can be erected for the sum of \$10,000. The pool will be 40x80 feet, will be built of concrete lined with asphalt, over which will be set enamelled brick facing. The floor of the building will be of concrete and all hardware will be heavy brass. The front will be of granite and light-colored pressed brick topped with terra cotta.

**WATER METERS BEFORE FILTRATION.**—Before the city of Pittsburgh, Pa., attempts to build a filtration plant, a prominent engineer says that it should install a complete system of meters. It would be useless to filter the water and then have so much of it wasted as at present. The cost of the water to consumers could be readily gauged so that, for their necessary supply, they would pay less than at the present flat rate and a great amount of water would be saved. In an ordinary house, with the meter system installed, the cost of a year's supply of water should not be more than \$10. After the meters were introduced, the amount of water to be filtered would be materially less than at present and the cost to the city would be much less than as planned. With a system of meters it is estimated that Pittsburgh would require only about 30,000,000 gallons of water a day.

**TO COMPETE WITH PAVING CONTRACTORS.**—It is proposed that the City Engineer of Baltimore enter into competition with contractors for the paving of the city's streets. The fact that a contractor's bid for doing some paving was much larger than City Engineer Fendall estimated he could do the work for by day labor suggested the question as to whether the City Engineer could not make bids for all paving and, where he was the lowest, do the work himself. While the Board of Awards would not have the power to select between the contractors and the City Engineer before the work is advertised, but if, after the bids are opened, the City Engineer says he can do the work cheaper than any of the bidders, the Board should have power to throw out all the bids and give the work to him. Inasmuch as the City Engineer must pay higher wages and allow shorter hours than do the contractors, the two would be on practically the same basis.

**FUND TO BUILD PUBLIC ROADS.**—The President of Nicaragua has created a fund for the construction and repair of public roads. A direct personal tax on all male citizens over the age of eighteen and on foreigners living in the country with the exception of those of the military service, students and men over sixty years of age, will supply the funds. The tax is graduated, however, into five classes. Day laborers are not to pay in money, but will give two days' labor each year. Clerks and artisans working in establishments not their own will be taxed 40 cents. If they own their establishment the tax will be double the other amount. Travelling agents and persons owning property in the city must pay \$2.01 annually and planters and farmers owning their land \$4.03. This proposed fund and the purpose for which it has been instituted have given great satisfaction for the public highways have always been in bad condition.

**SUCCESS OF FREE EMPLOYMENT BUREAUS.**—The third year of the existence of the Illinois Free Employment Offices shows an ever increasing total of positions secured for the unemployed. Men and women of all vocations have made application for work at the three offices in Chicago and the one in Peoria, and in the great majority of cases positions were secured for them. During the last year a total of 27,779 men and 14,134 women applied for help and work was found for 23,863 of the former and 12,870 of the latter. For the three years that the offices have been in existence, 89,536 out of 109,210 applicants were provided with employment. Of applications for assistance, there were 50,301 and 43,517 of these were aided. These figures show the good work that is being done by the employment bureaus. Here, without cost to themselves, men and women may apply for employment or assistance which in nine cases out of ten is supplied.

**MINE PAYS CITY'S EXPENSES.**—Most cities in the world are suffering under the burdens of taxation in order to pay their bills, but Baker City, Wash., is not so afflicted. In fact it is one of the most favored communities, for it is the owner of a water works system that is a gold mine in itself. This is true literally as well as metaphorically, for when the authorities, about a year ago, established a gravity water system to supply the city with water from Elk creek, the purchase included title to the Nelson placer mines. Pure and abundant water was the result of the purchase, but the gold mines thus secured, whether worked by the city or leased to other parties, will afford sufficient revenue to pay all the expenses of the city government and allow the city fathers to make many needed improvements, such as a sewer system, electric lights, pavements and street sprinkling. The city's debt is also to be wiped out through the new source of revenue.

**DISPOSAL OF SEWAGE IN LONDON.**—The city of London, Ontario, has what is known as the "international" process of sewage disposal. The new sewers which have been installed measure over 39,300 feet in length, and the sum of \$152,500 has been expended in their construction, as well as in the establishment of filtration beds. The purification of the sewage is effected by deodorizing it and precipitating the solids in settling tanks by a chemical. The deodorant is known as ferozone. After the sewage is treated by this chemical it is filtered through a bed containing polarite and the effluent is very pure. This process is a continuous one, and is not interfered with by the removal of sludge. The polarite is a black, hard and very porous substance, which is insoluble in water and never requires renewing. The ferozone is rich in salts of alumina and salts of iron, both in the ferrous and ferric conditions, and its great solubility is responsible for the rapid subsidence of the suspended solids.

**ORDINANCE FOR SAFETY AIR-CUSHION.**—The city of Newark has followed the good example of New York, Philadelphia, and other progressive municipalities in passing an ordinance requiring the use in all public buildings having elevators to be equipped with the safety air-cushion. It provides that, "Every passenger and freight elevator now in use or hereafter erected in the city of Newark shall have what is known as a safety air-cushion built of masonry, steel or other fire-proof material, the depth of said air-cushion to be not less than one foot to every ten feet of height of elevator run, or such other device or devices for the safety of passengers as may be deemed advisable and expedient, to be determined by the Superintendent of Buildings in the first instance, and, on appeal by any one interested, by the Common Council, by resolution. Each elevator cab or car shall be subjected to a test as to its absolute safety by dropping such cab or car from its highest point to the ground floor."

**TO MAKE ROADS DUSTLESS.**—The heavy black oil from the wells in Los Angeles, Cal., and vicinity has been used for a number of years on the country roads around that city with excellent results. The most successful application is in the road district south of the city of Los Angeles. It is applied by means of tank wagons of thirty to fifty barrels capacity, fitted with an attachment somewhat similar to that on the sprinkling carts used on streets. The usual method is thoroughly to cover one-half of the roadbed, so as not to interfere with travel, and after an interval of twenty-four or forty-eight hours the remaining half is similarly treated. This is repeated until the dust is thoroughly saturated to a depth of one or more inches, depending on the previous condition of the road, and the continuous travel soon packs the soil, forming a dustless road. Usually one coating a year, if applied as described, is sufficient to render dustless the worst of roads. The reason given by certain railroad companies for discontinuing the use of crude oil on their roadbeds probably would not exist if the oil could be thoroughly incorporated with the fine particles of dust, as is done on the wagon roads of California, by the travel over them.

**ELECTROLYSIS AND WATER RATES IN ERIE.**—Like so many other cities which have the trolley, the city of Erie, Pa., has suffered from electrolysis to the water pipes. Mr. A. A. Knudson of New York, an expert on electrolysis, made a voltmeter survey of

the mains last year and ascertained that the mains in certain locations already had suffered material damage from the electric currents which come from the trolley cars and that they were sufficient to destroy in time the entire system. The only remedy, in the opinion of Mr. Knudson, is for the trolley company to adopt the double trolley system and cease to use the rails as a return path of the current to the power house. The following yearly schedule of water rates is in force in Erie: Bath-tub, \$3; family, \$4; basins, \$1; sleeping rooms, \$1; wash-tub, \$2; closet, \$3. Among the rates for other fixtures is one for billiard tables, \$1, but if the floor is carpeted, only one-half this rate is charged. By meter, water is charged for at 20 cents per thousand gallons per quarter for the first 25,000 gallons and 4 cents for each thousand gallons extra. The minimum rates are placed at \$3.75 for a three-quarter inch meter, \$4.50 for a one-inch, and \$100 for a six-inch.

**GLASGOW STREET RAILWAYS A SUCCESS.**—Electric traction at Glasgow, Scotland, has added nearly \$1,000,000 to the revenue for the year ended in May last. The working expenses remained as before, although the transition from horse to electric traction was not complete and the expenditure not down to its normal level. The result was an increase in the profit from \$438,145 to \$1,050,000, after a generous provision had been made for depreciation. The fares were reduced by the lengthening of the stages. The street railways carried nearly 500,000 passengers a day—almost the total population of the city. The average earning per mile run is constantly increasing and is now close on 25 cents. The average fare is less than 2 cents. Horse traction ceased altogether in April last; and so well has the corporation managed the railways, that it has written down the horse traction plant to scrap value and renewed the whole track entirely in eight years, all out of revenue. They have made heavy inroads into their renewal and reserve funds this year in order to wipe out the old capital, with the result that the new system of electric traction starts almost entirely unburdened by any expenditure connected with the old. It is calculated that if the present rate of progress continues Glasgow railways will soon carry 1,000,000 passengers a day and earn \$5,000,000 a year.

**PROPOSED CHARTER FOR LOS ANGELES.**—The committee that has been revising the charter of Los Angeles, Cal., has made some radical changes in the old instrument. Direct legislation forms the most important subject for the citizens to vote on. After years of discussing the initiative, referendum and recall, the revisers of the charter recommend that that system be tried in Los Angeles. By means of this method, voters may inaugurate legislation, pass on proposed ordinances of the council and recall officials who do not prove satisfactory. A petition signed by from 5 to 25 per cent. of the voters at the last election will accord all the voters the privileges above. Under the present system, the Board of Public Works is a standing committee of the Council. It is proposed that hereafter three members of the Board be appointed by the Mayor for terms of three years. Only a bare majority shall be of the same political faith. Members of boards are to be so appointed that only a portion of the entire board will retire every year. A superintendent of public works will be appointed by that board which also will appoint the City Engineer instead of his being elected as heretofore. The Board of Education is to consist of seven members elected at large. The Building Superintendent and all plumbing and boiler inspectors are to be appointed by the Mayor. Hereafter the officials to be elected shall be: The Mayor, Councilmen, City Clerk, City Attorney, City Treasurer, City Auditor, City Tax and License Collector, City Assessor, police judges, and members of the Board of Education.

**NO REASON FOR SMOKY CHIMNEYS.**—The Health Officer of the City of Washington, D. C., Dr. William C. Woodward, recently submitted a statement to the Commissioners upon the practicability of compliance with the anti-smoke law. This law is stringent in its provisions against the issuing of black smoke from chimneys, and the authorities have been endeavoring to enforce it while the offenders have claimed that the smokeless chimney is not possible. While the law is very strict, as a matter of fact it does not forbid the emission of smoke, but only dense black or gray smoke and cinders,

and no prosecution has been based on the emission of smoke for one minute or less, as claimed by several of those who were fined. The practicability of smokeless chimneys is shown, according to the health officer, by the Federal buildings. He says that dense smoke is rarely seen coming from the department buildings. The Navy Department has a large power plant which has been operated within statute. The Bureau of Engraving and Printing, while a large consumer of coal, has found it feasible to prevent the emission of smoke. While some hotels in the city have been fined for violating the smoke law, they have complied with the law for considerable periods. Many other buildings in the city are mentioned in the health officer's report, as complying in most part with the law, but it states that in many instances the law has been violated after repeated warnings, and inasmuch as so many buildings have been able to operate within the law, there is no reason why the others should not be compelled to do likewise.

**THE STREETS OF COLUMBIA.**—All the streets of Columbia, S. C., are 100 feet wide and are laid out at right angles. The problem of sewerage was made easy by reason of the fact that the city has spread out on either side of Main street, which is on a ridge. This fact also simplifies the question of water distribution. The water is pumped from springs to a reservoir on the ridge. The water is filtered by the Jewell system. All along the streets in artistic order were originally planted elms, oaks, etc., which give the streets in the resident portions of the town a park effect. Not only does this give beauty to the streets but is largely responsible for the good health of the city. The city owns a rock quarry within its limits and has access to the labor of convicts at the state penitentiary. Macadam roadways, eight inches in thickness, can be laid at a cost of 30 cents per square yard. This macadam forms the greatest part of the street paving. To prevent dust, experiments have been tried of oiling the streets. On about 3,325 square yards of roadway was sprinkled six barrels of crude petroleum costing, with the freight \$32.42, or about 1 cent per square yard, without counting the labor which was donated. The sprinkling was done by a small spraying machine and a small hand pump was used to force out the oil. After three months another application of oil was made. Oil purchased in quantity and applied by experienced men would greatly lessen the cost. It was found necessary to oil the streets every three months. Opinion is divided as regards the value of the oiling, the main objection being that the streets are not so cool or fresh as after watering. But dust does not form as after watering. Drivers of wagons are in favor of the oil.

### Bricks from Refuse

The corporation of Brighton, Eng., is turning the clinker refuse into a valuable commercial product. A portion of this is converted into mortar while other parts will be transformed into bricks. A committee visited the Netherlands where, at The Hague, they saw the refuse works which were converting the clinker refuse into bricks.

The destructor at Hollingdean, which was visited, treated over twenty-seven van loads of house refuse in 1901, the residue amounting to 9,000 loads of old tin, clinker and ashes. The tins were flattened and sold at sixty-two cents per ton, and over 1,200 loads were made into mortar, which sold at a profit of \$437. For foundations for roads and pavements, 1,544 loads were used. About 1,100 loads were given away, but still there were about 5,000 loads for which there was no use.

On the advice of an expert it was estimated that a clinker crushing plant could be installed for a little over \$4,000, which would take care of 1,500 of the 5,000 loads and, allowing for interest and maintenance and \$260 per year for labor, the broken clinkers would yield a net profit of \$300. For the remaining 3,500 loads, which consisted of fine clinkers and ash, a plant could be provided capable of converting it into 8,000 bricks a day, for the sum of \$13,600. The cost of these bricks—which would amount to about 1,000,000—including the interest on the investment, would be about \$3.25 per thousand; the selling price of the bricks per thousand would amount to about



\$7.00, and the total profit of the work would aggregate nearly \$6,500. In addition to the bricks, slabs could be made of this refuse which would yield even a greater profit. Over 34,000 yards of slabs could be made from the 3,500 loads of refuse and sold at one dollar a yard, leaving a net profit of over \$9,000 per annum. The city of Birmingham is one of the municipalities in England that is engaged in making slabs. The plant, which cost \$10,000, has been paid out of the revenue derived. In 1899, two years after the plant was started, it turned out 8,800 square yards of slab and in 1901 over 9,500. These slabs, which are user for foot paths, are two and one-half inches thick, faced with granite, and cost to produce 54 cents per slab. The selling price runs from 62 cents to 81 cents.—*The Public Health Journal*, London.

### Meeting of American Park Association

If the question had been put to vote to learn what were considered the three most interesting features of the annual meeting of the American Park and Outdoor Art Association in Boston, August 5-7, the result would have probably favored, (1) the tendency of the meeting toward a federation of kindred interests engaged in betterment work; (2) the encouraging report of Mr. Parker, of Hartford, in behalf of the Committee on Park census; (3) the suggestive address of President Eliot, of Harvard University, on the "Popular Utilization of Public Reservations." Mr. Parker announced that the results of the Park census would be printed in the Souvenir Booklet issued by the MUNICIPAL JOURNAL AND ENGINEER and would be thus accessible to members who desired it. In preparing this census Mr. Parker had been impressed by the lack of uniformity in the park reports that are published, many of which are mere financial statements and give no helpful suggestions for other commissioners. Because of this lack of information much unnecessary work is attempted, which might be avoided if the experiences of others could be published. This suggestion for a permanent body to prepare and publish information concerning parks was received with hearty approval and a committee was appointed to confer with the Massachusetts Horticultural Society, the Secretary of Agriculture or with Prof. Bailey, of Cornell university. If none of these agencies could be prevailed upon to undertake such work, then the committee was authorized to devise other means for the preparation of such reports.

The exhibition of the tendency toward a broadening of the association so as to include other attempts at aesthetic betterment beside park building was apparent when the council of the Association decided to recommend the election of a salaried secretary. It was evident from this meeting that some federation was desirable between the societies, so each speaker was chosen to represent his society on a committee appointed to devise some means to bring about greater cooperation. The association decided to go farther than this and it dropped the name of the Park commissioner it had chosen for president and to present instead the name of a lawyer who has long been identified with municipal work—Mr. Clinton Rogers Woodruff of Philadelphia. Mr. Woodruff was also elected chairman of the committee on federation so the objects of the association in this particular were thoroughly carried out and results may be expected. He is a good organizer and is familiar with the needs of societies enlisted for municipal betterment.

President Eliot's paper had suggestions enough to occupy the attention of one annual meeting and most of them will undoubtedly be considered further by the delegates who heard them. In his opening he referred to the fact that our public reservations are not enjoyed to their full capacity for pleasure giving, for people seldom resort to them in the winter months, while those who drive through them in summer do not even leave their carriages to remain long in the woods or to learn about them intimately. Therefore he thought that we should encourage frequent visits to the woods and parks at all seasons of the year and for longer stays than are usually made. He contrasted the difference of the habits of people in this country with those abroad in this particular and made many suggestions of regulations which might tend to popularize reservations. Special emphasis was laid on the need of adjusting the methods of transportation to and from parks so as to make access to them easy and to

render departure more simple and prompt. As it is, **railroads** are given only a few hours in which to transport thousands to the beaches or other public grounds, while the crowds wish to return at about the same time. The result is crowding and no little confusion, especially at the close of the day. As one way to avoid this he suggested that the transportation companies provide strongly built cars providing standing room only. Such cars would hold many more than those with seats and excursionists would be satisfied provided lower rates of transportation were charged than is usual for cars with seats.\* In order that people driving in carriages might be tempted to explore the recesses of woods he would have plenty of hitching posts planted, for these would also save the trees. He thought that numerous foot paths might be opened to the rustic bits of scenery and that plenty of chairs should be provided, for many would object to seats on the ground. For better protection and to add to their attractiveness he advised that every city garden and square should be thoroughly lighted. Although beer drinking cannot be allowed here as it is abroad, simple lunches add much to the pleasure of recreation seekers and they cultivate the habit of family picnics. The articles of food on sale should be simple and inexpensive. There was general approval of all these suggestions, but it was when President Eliot said that people should be allowed to pick wild flowers, ferns and shrubs, under proper observation, that his idea met with considerable disapproval, for many were incredulous about the practical effect of such license.

While no public discussion was had on the subject, many differences of opinion were heard on this subject. Perhaps George M. Loring, the "father" of the Minneapolis park system, best expressed what many of the others felt that such liberty would be impractical and would result in destruction. He had found it to be a trait in human nature to secure many more flowers than one needs when there is the opportunity to lay hands on them. When the Minnehaha Park was laid out in Minneapolis it was filled with beautiful ferns, but as soon as the public was admitted the ferns began to disappear. He had seen people pull whole bunches of ferns up by the roots and then leave them on the ground as they took the car home. There were no restrictions about picking and the ferns soon disappeared. He had seen similar conduct in a California town where people were at first invited to pick fruit and flowers. In gathering peaches visitors would actually tear down whole branches, so it was necessary to withdraw the privilege. Another delegate told of an incident within his observation where a man had raised a fine row of sweet peas. The occupants of a passing carriage stopped to admire them when he invited the women to help themselves. To his surprise they picked them with an avidity that might be expected in case each blossom were a gold dollar. They filled the front of the carriage and then opened an umbrella which they proceeded to fill with the flowers. "And yet," he said, "when we hunt for pond lilies do we not get all we can? We pick a bushel of them when a bunch would be enough."

The association had hoped to secure an exhibit of scenes around railroad stations showing the improvements that had been made in landscape gardening, but were unable to arouse much interest in the matter. Another disappointment was in the failure to secure designs for model signs and posters. A manufacturer who is interested in the subject offered some prizes for such drawings, but only one was submitted. The interest taken by the newspapers in the abatement of the advertising nuisance was shown when a New York paper sent a photographer to reproduce the one sign—and it was not a remarkable example either. But the Association does not propose to abandon this feature of its work which is being prosecuted so vigorously, especially in Chicago.

\* If separate cars were provided for men and women this might help to solve the vexing problem, but it would prove unsatisfactory otherwise.—[EDITOR.]

As we go to press the League of American Municipalities is holding its sixth annual session, at Grand Rapids, Mich. For this reason it is impossible for us to do more than publish those papers and addresses, copies of which we could secure prior to the date of meeting, in this number. The full account of the convention, including the balance of the papers and the discussions, will appear in our October issue.

### Special Asphalt Block for Toledo

THE city of Toledo, during the current season, had one special paving feature. It was decided to re-pave a street with asphalt block of a special size. The street railway, which was laid with a light tram girder rail, was also re-constructed.

City Civil Engineer George W. Tonson described the work as follows: "As regular asphalt blocks are four inches thick, and the original sheet asphalt but two and one-half inches, the laying of four-inch blocks, with the necessary cushion, would have made a serious difference of grades at cross streets, which are nearly all paved with sheet asphalt. It was therefore decided to lay a special three-inch block, and instead of the usual cushion to use a one-half inch cushion of Portland cement mortar.

"The street car tracks were laid originally on the clay sub-grade, with a light ballast of sand. As re-constructed, a bed of Portland cement concrete, six inches thick, was laid below the grade of the bottom of the ties. The track was then laid and lined up, and surfaced by tamping a rather dry mixture of three parts sand and one part Portland cement under the ties. The concreting was then finished by filling up between the ties to the concrete grade. Great care was taken in tamping the concrete under the rails between the ties so that the rail should have a continuous bearing. This is the regular method of laying tracks on streets with concrete base. Street railway traffic was not interrupted during the progress of the work, one-half the work being done at a time.

"The special feature of the work was the laying of the block on a mortar bed. The mortar was made of three parts sand and one part of Portland cement. At first the mixture was made rather wet, like stiff mortar but it was found that the blocks settled unevenly and the mixture was then made quite dry, about as for a sand briquette for testing purposes, and mixed until it became moist. This was found to be satisfactory.

"The cushion was spread and brought to a surface by the use of a template. The blocks were laid as a tile floor is, from a light platform upon which the men knelt, and each block as laid was lightly settled with a paving hammer. Great care was required in keeping the rows straight and the surface perfect, but the men soon became expert.

"After the pavement was laid it was thoroughly grouted with a thin grout of one part cement and one part fine sand and gone over until the joints were full to the surface. The pavement has been in use about two months and is very smooth and sightly. The work was done by C. H. Burchinal, manager of the Lake Erie Asphalt Block Company."

### Union of Canadian Municipalities

THE powers that are being obtained by railway, telephone and other companies, irrespective of the rights of the people, and the tricks and illegal practice that are resorted to to obtain these privileges, has shown the cities of Canada the necessity of combining for mutual protection. With this object in view the Union of Canadian Municipalities was formed at Toronto a year ago.

Co-operation for the advancement of all municipal interests, especially legislative self-protection, is the main object of the organization and the amount of work already done along these lines has won the approval of its members. Other definite objects of the Union are declared to be, "the securing of united action for the protection of individual municipalities and municipal interests as a whole against legislative or other encroachments of corporations," the holding of meetings to discuss subjects of interest and the improving of legislation on municipal questions.

During the year past the Union representatives have appeared before the legislatures of the provinces and the Dominion Parliament. Before the latter a memorial protesting against the encroachments of corporations on the municipal control of the streets. Modifications of such bills was the result of the protest. Other bills before the legislatures have been either modified or thrown out because of the action of the Executive Committee of the Union. The telephone companies were checked in their grasping schemes and governmental regulations in regard to rates were placed upon them. This

was due to the work of the Union. The Union has secured a promise of a general act controlling rates, compelling long service connections and looking towards a cheap national system.

The municipalities are all resisting the demands of the private railway or other companies and it is the purpose of the Union to assist and encourage the cities in this resistance and, if necessary, to carry every case to the highest courts. Already the power of the Union is respected by the corporation lawyers and its wishes are sought on bills before they are presented. Resolutions of thanks for services rendered have been passed by city councils and presented to the Union. The results accomplished during the few months of work have caused the Executive Committee to feel that the existence of the Union is justified. Support of all the cities and towns in the Dominion is necessary to the continued existence of the Union and all such bodies are urged to join and assist in the good work. The following moderate fees are charged to members: Townships, parishes and incorporated villages, \$2; counties, \$5; towns and cities under 10,000 population, \$5; towns and cities under 50,000, \$10; places over 50,000 inhabitants, \$25.

This year the second annual convention of the Union of Canadian Municipalities will be held at Montreal, September 15 to 17, and every Canadian municipal council can send one or more delegates. The preliminary programme promises an interesting meeting. The address of welcome will be delivered by Hon. James Cochrane, Mayor of Montreal. Three sessions are to be held on the first two days and entertainment will be provided for the visitors. On the 17th the election of officers will be held in addition to the regular business, and a reception and luncheon will be tendered the members by Mayor Cochrane and the Council on Mount Royal. Some of the subjects to be discussed during the sessions are: Provincial Rights in Municipal Affairs; Municipal Home Rule; Proposal for a Financial Union; the New Telephone Bill as It Concerns Municipalities; Public Ownership in Canada; Compulsory Arbitration for Corporations and Employees Operating Public Services; Power to Expropriate Property Outside Limits; Sinking Fund Investment; Level Crossings.

The present officers of the Union are: Hon. Oliver M. Howland, K. C., C. M. G., Mayor of Toronto, president; Hon. W. D. Lighthall, M. A., F. R. S. L., Mayor of Westmount, secretary-treasurer. The Executive Committee is composed of a first and second vice-president from the several provinces given in their order as follows:

For Ontario, Mayor F. Cook, Ottawa, Mayor Aaron Read, Owen Sound; for Quebec, Mayor James Cochrane, Montreal, Mayor W. D. Lighthall, Westmount; for Nova Scotia, Mayor Adam B. Crosby, Halifax; for New Brunswick, Alderman A. W. McRae, St. John; for Manitoba, Mayor John Arbuthnot, Winnipeg, Mayor Alexander Kelly, Brandon; for British Columbia, Mayor Charles Hayward, Victoria, Mayor Thomas F. Kneeland, Vancouver.

### New Sewerage for Bremen

WHILE Bremen is one of the oldest cities in Germany, the sanitary conditions have not been of the best, and at last the authorities have determined to improve the sewers. The steady growth of the city has made it probably the second commercial port of the country, and it possesses one of the largest merchant marine fleets in the world. The population and wealth have also steadily increased, the number of inhabitants at present amounting to 182,000. Notwithstanding this, the sewerage system is far from being what it should be. Since 1893 the "Tonnen" system has been used, each family having buckets with tight fitting covers, which are collected at all hours from in front of the doors. In 1899 ordinances provided that all houses built thereafter on streets equipped with sewers, should be provided with water flushes to the closets, but it was not until this year that the government decided to drain the entire city by a complete system of sewers. The sewer connections will be brought to the curb stone in front of each property free of charge, and the owner will connect from the house.

The sewage will be carried by the main pipes to settling or clearing basins, and thence empty into a small stream three and one-half miles below the city; the intervening country being sandy it is well adapted for clarifying purposes. These extensive improvements will create a great demand for sanitary appliances.



### The Work of a Live Mayor

FOR the past fifteen years the public service corporations in Kansas City, Mo., have had things all their own way. The election of Mayor James A. Reed, however, was the beginning of the end, for he immediately declared war against them all, and, after hard fought contests, has won two big victories. Upon his accession to office, Mayor Reed endeavored to persuade the electric light company to reduce its price per arc light from \$100 to \$75. After numerous conferences and the refusal of the company to comply with the city's request unless the number of lights was doubled, a thing impossible under the appropriation, Mayor Reed sent a message to the Council advising the erection of a municipal electric light plant. Immediately the company offered to reduce the price to \$82.50 and the city accepted the offer. Thus the Mayor won the first victory.

Another controversy lasting nearly three years has been ended with the city the victor. Mayor Reed was nearly the only one in office who was opposed to the Metropolitan Street Railway Company in the fight to make it give some adequate return to the city for its privileges. The election of 1902 swept all these men out of office and the Mayor had clear sailing. He directed the Corporation Counsel to bring suit against the company for annulment of its franchises because the conditions had been violated repeatedly. The company surrendered immediately.

It promised to pay 8 per cent. of its total receipts to taxation, the city to receive what is left of this after State, County and city taxes are paid. The company agrees it shall be never less than \$100,000 a year for the balance of the life of the franchise or twenty-three years. The company is to spend at once \$6,000,000 on improvements and to grant universal transfers, with a faster schedule, instead of the four-cent fare.

### London's New Tunnel

ONE of the most notable events in connection with municipal affairs in London during the past month was that of the opening of the new tunnel under the Thames. This project was commenced only eight months ago and has been completed at an outlay by the London County Council of £120,000 or \$600,000. In accordance with a time honored custom which is followed in similar enterprises, the first two or three days after the subway was opened, a small charge was made for its use, and in this case the funds so collected were turned over to the Seamen's Hospital and the Poplar Hospital for Accidents, as a sort of reimbursement for the expense entailed in taking care of the persons injured while employed in the construction of the tunnel. The number of accidents occurring during the building of this tunnel has been exceedingly slight, much more so than in any similar case of previous years. There was not a single fatality during the whole time the work was carried on.

The chief object in the construction of this new tunnel was to provide a means for the thousands of working people who have to cross the river to and from their work. The original project was to make it slightly smaller than that at Blackwell and to carry vehicles as well as foot passengers. But this idea was soon dropped. It was impossible to construct the necessary approaches, and, besides there was little promise of any vehicular traffic with Blackwell Tunnel so near on the one side and the promised Rotherhithe Tunnel between the Isle of Dogs and the Tower Bridge on the other. The approach on the Greenwich side is from the north end of Church street, in the rear of the famous Ship Tavern, and on the Milwall side by a foot path 15 ft. wide at the western end of Island Gardens.

A ferry between Greenwich and the Isle of Dogs has existed for a considerable time. The exclusive privilege of working it, which had been enjoyed since 1676 by a company called the Petters' Ferry Society, was partly abrogated by the Poplar and Greenwich Ferry Act, passed in 1812, creating a statutory ferry for horses and vehicles, but leaving to the society its rights in respect to foot passengers. The horse ferry was discontinued by the Metropolitan Board of Works in 1883, but the foot passenger ferry rights still exist, and are owned by the great Eastern Railway Company, and leased by it to the Thames Steamboat Company. Notwithstanding the grave objections and hindrances to a steamboat ferry in a crowded river like

the Thames the yearly traffic amounts to about 1,300,000 passengers. The entrances at both ends of the tunnel are by means of circular shafts, 35 feet in diameter with stairways and electric lifts. The depth of the Poplar shaft is 60 feet, and that at Greenwich 66 feet. The tunnel itself is lighted throughout by electricity, and is 1,217 feet long and 11 feet in diameter inside. It is 60 feet below high-water level, and was driven with a shield under compressed air at a pressure varying from 16 pounds to 27 pounds above the atmosphere from the north side. Many difficulties were encountered during the process of the working, but the shield was capable of successfully combatting them all. At the commencement there was discovered at the bottom of the incline, on the Milwall side of the river, a hard shelly clay of about 4 feet in thickness, and this accompanied the excavators with variations, right across the river. At those places where the shelly substance was lost, the shield came into contact with a mass of green sandy ballast mixed with a kind of mottled clay. Subsequently it struck a vein of very beautiful and fine sand almost of the consistency of ground sugar.

The tunnel is formed of 1,670 tons of cast-iron segments, and it is faced with 180,000 white enamelled tiles. There are seven miles of joints caulked with iron borings, and 150 tons of bolts, representing a length of five miles, have been used in joining up the iron segments. In the entrance shafts, including the stairways and domes, there are 300 tons of steel. At no part of the tunnel is its top less than 13 feet below the river bed. An innovation has been introduced in the method of conveying the electric wires for lighting purposes. These are for the first time enclosed in over 3,000 conduit boxes glazed inside and out.

### Wide Streets

A NARROW residential street may be a very attractive one if the houses stand well back from the street-line, with pleasant grounds about them. In a growing town, however, the danger from such conditions comes with the liability to convert the street to business purposes, or to erect more compactly disposed dwellings. If business comes in, the transition is commonly marked by jagged lines. Commercial structures, often of a cheap, and undesirable aspect, are built out to the street, while the dwellings stand recessed back at irregular intervals. And when at last the street is fully occupied for business purposes, it is altogether too narrow; the roadway and the sidewalks are cramped, and often a widening has to take place at the public expense. If built up closely to the line with dwellings, the street is likely to lack air and sunshine, and the tendency is toward squalid conditions.

An excellent remedy for these evils is offered in the Massachusetts law that empowers municipalities to establish building lines at any desired distance back from the street line. When such a line is established, no buildings can be erected on the intervening space. The municipality acquires an easement in this strip of land, which can still be used by the owner for anything but building purposes, and, on the establishment of such a line, owners may claim damages, as in case of takings for a street-widening. It is, however, commonly more of a benefit than a damage to have property thus restricted, for it assures a more permanently desirable character to the street; and in case a street-widening should ever be called for, no obstacles will stand in the way: by taking the restricted strips, there will be ample room for the wider roadway and sidewalks.

Ideals for attractive street-planning are to be found in many parts of the United States. There is nothing more charming as a rural street than that of a New England village at its best—lofty aisles of leafage, the trees with feet in a carpet of turf at the sidewalk border; the houses, quiet and unobtrusive, standing well back, and marked with the true home character, whether they are humble cottages or abodes of the rich. The noblest development of such rural streets is to be found in the old towns of the Connecticut valley and in western Massachusetts. There the main highways have an extraordinary generous width, often giving room for quadruple rows of old elms and broad spaces of turf, the roadway requiring only a narrow space in the total width of the thoroughfare.—[Sylvester Baxter, in the *September Century*.]

## INTERNATIONAL FIRE CHIEFS

### Guests of the Biggest Fire Department in the World—Wonderful Development of the Present System—The Training School—Program of the Convention

To look at the fire department of New York to-day it does not seem possible that fifty years ago steam fire engines had not been introduced into the Metropolis and that but thirty-seven years have passed since the department was established on a paid basis. As late as the early 50's the hand engines were the pride of the firemen and the service they rendered was not to be despised. From the earliest days to the middle of the nineteenth century, the safety of the city from fire rested on the hand fire engine and the willing hands that manned its brakes.

#### THE VOLUNTEER SERVICE

The institution and development of the volunteer fire service in New York was the simple response to the needs of the hour and, as the city grew, the service of necessity grew with it. It is difficult to compare the department of to-day with that of former times for conditions are entirely changed. Without placing the volunteer service on a footing with that of the present day, it cannot be denied that the volunteers did excellent work with the apparatus at their command. In those days the supply of water was not abundant for it was after this that the Croton water system was introduced into the city. Its coming necessitated an entire reorganization of the department.

In 1835 a watchman was stationed in the cupola of the City Hall who, in the event of a fire, would ring the bell. A flag by day and a light by night were hung in the direction of the fire. The watch-houses, market and all other alarm bells were rung also as long as the City Hall bell continued. The watchmen were later extended to the

cupolas of other buildings in the city. In 1842 the city was divided into districts and these again into sections and each had a certain number of bell strokes so that the location of a fire could be determined from the bells. The watchmen received \$1.25 a day, which was increased to \$1,000 a year in 1864.

#### INTRODUCTION OF THE MORSE TELEGRAPH

A better system of alarm, however, was needed and, in 1846, the Council authorized the introduction of the Morse magnetic telegraph. The police stations were connected with the bell towers and alarms were transmitted to the bell ringers. It was not until 1852 that the bell towers were connected with fire headquarters.

The police did not form any fire lines about the scene of the conflagration and firemen and onlookers formed one mass of excited, yelling and often fighting men. Great disrepute was brought upon the volunteer firemen by the gangs of rowdies that always gathered at such times. In 1855, however, ordinances were passed providing that the police should form lines 200 feet from the fire and keep back all those that could not show proper badges or who did not wear the uniform of a fireman.

Fighting among the fire companies was a common thing both going to and coming from fires and even at the fires themselves. Certain companies were frequent offenders and could scarcely approach one another without coming to blows, overturning and injuring apparatus and endeavoring to inflict as much damage as possible on the other. An alarm in certain sections of the city was almost sure to cause a



CHIEF EDWARD F. CROKER AT HIS DESK AT FIRE HEADQUARTERS



disturbance of more or less serious nature. Gangs of ruffians were wont to lay in wait for the firemen, attack them in overwhelming numbers and destroy their apparatus. The firemen were even attacked at fires and the police did not dare interfere because of the political influence of the ruffians.

The increase in the number of volunteers kept pace with the growth of the city until the force began to be unwieldy. Thus in 1854 there were forty-eight engine, fifty-seven hose and nine hook and ladder companies, with a total of 2,950 men, or, if the companies had been full, 4,480. The number of fires amounted to 385 in this year and about one-half of them were of incendiary origin. In 1858 the number of engine companies had increased to fifty-one, there were sixty-one hose companies, fifteen hook and ladder and four hydrant companies. The department was then costing \$132,500 annually, and the service was not beginning to meet the needs of the city as they are met at the present time.

#### INTRODUCTION OF STEAM FIRE ENGINES

While in 1857 an appropriation of \$19,500 was made for the purpose of trying steam fire engines, it was not until January, 1859, that the

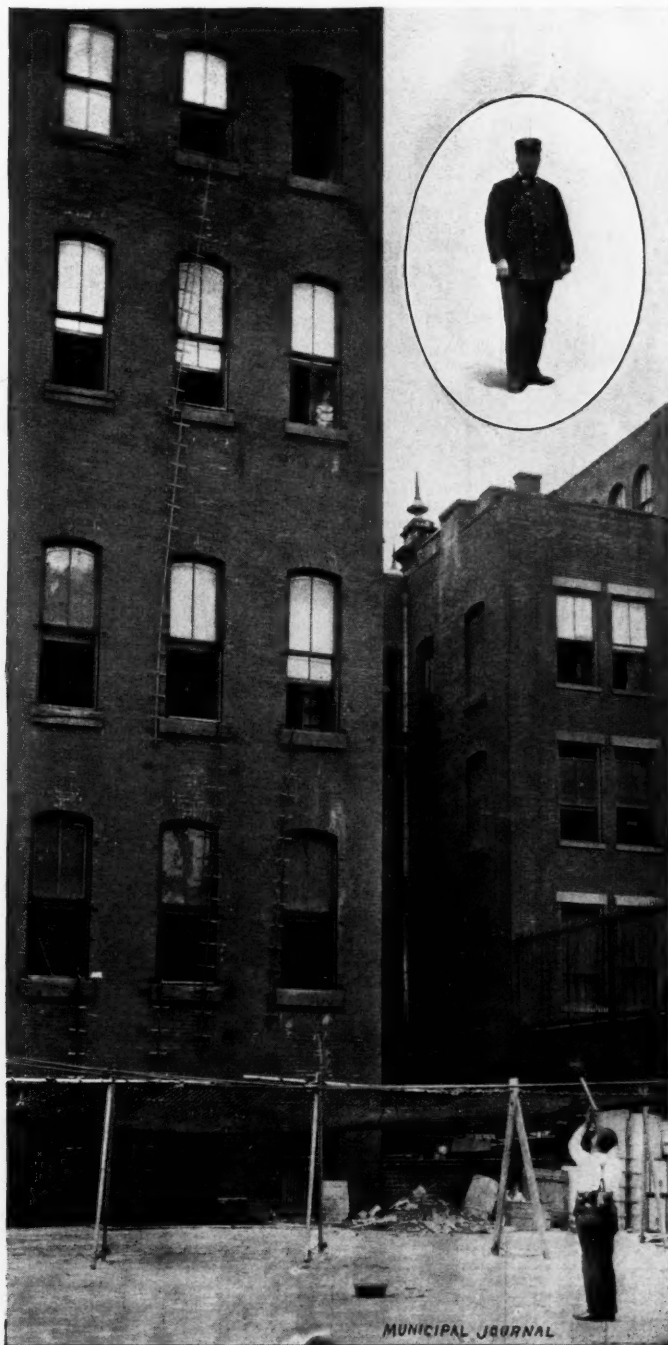
trials were actually held. The test failed to satisfy the department as to their utility. Chief Harry Howard, who had been selected in 1857, said that they were too large and powerful and would do more damage by water than any good they could accomplish. He considered them good only on extraordinary occasions as auxiliaries and he questioned their capability and quickness in operation. The insurance companies seemed to consider the steamers of value for they offered to furnish one to the city and their offer was accepted. In 1860 John Decker became chief of the department and he condemned the use of the steamer also, but two years later a good share of the estimated expenses of the department (\$380,512) was for steam fire engines.

#### PAID DEPARTMENT BECOMES NECESSARY

The time was now approaching when the needs of the city required a simpler, more compact and more effective service and the volunteers had soon to give way to a paid force. On March 30, 1865, the State legislature passed an act creating a "Metropolitan Fire Department" for New York City. The governor appointed four commissioners to hold office for terms of eight years at salaries of \$3,500 per year. In May the commissioners organized, but immediately met with opposition on the part of the Attorney General, who tried to prevent the commissioners from taking over the fire department property of the city. The case was carried to the Court of Appeals, which decided that the law under which the commissioners were acting was constitutional. Both during the passage of the bill and afterwards the volunteers were vigorous in their opposition to it and the struggle was long, but the old fighters had to submit to the inevitable. It is to their credit that, after the paid department was a settled thing, they kept at their duties faithfully until discharged, for it was some time before the regulars could be organized sufficiently to take over the work of the volunteers. In June of 1865 the volunteer force consisted of 3,421 men. To do the work of this number, 500 regulars were to be trained. The Board of Fire Underwriters undertook the work of disbanding this large force and the whole work was accomplished with but slight resistance on the part of the volunteers. By November of 1865 all but the foremen and engineers had been honorably discharged. The latter were retained to assist in training the new paid men in their duties.

The important question, after the organization of the department, was the appointment of a competent chief, for it was seen that any mistakes of the new men would be magnified by the enemies of the system and all possible trouble made for it. After balloting twenty-six times, Elisha Kingsland was elected chief of the department at a salary of \$3,000. District chiefs were to receive \$1,200 and firemen \$700 per year.

Chief Decker turned over to the new fire commissioners thirty-four steamers, twenty-five hand engines, nearly 60,000 feet of leather, 7,600 feet of rubber hose and such small apparatus with all the engine houses and their furnishings. The commissioners paid for the last named articles at fair values, allowing the members of the volunteer companies to retain such bits of small apparatus as sou-



CHIEF INSTRUCTOR, HENRY W. M'ADAMS—SHOOTING THE LIFE-LINE



SLIDING DOWN ROPE



LOWERING A COMRADE



STRADDLING SILL

ized, disciplined and its success assured. Boards were organized to examine candidates for promotion and this was made for merit only. Attention was paid to the expenses and the greatest economy was observed.



LADDER CHAINS

venirs as struck their fancy. The whole conduct of the commissioners in this work was so governed that much of the opposition was disarmed and trouble averted.

#### THE NEW DEPARTMENT MEETS DIFFICULTIES

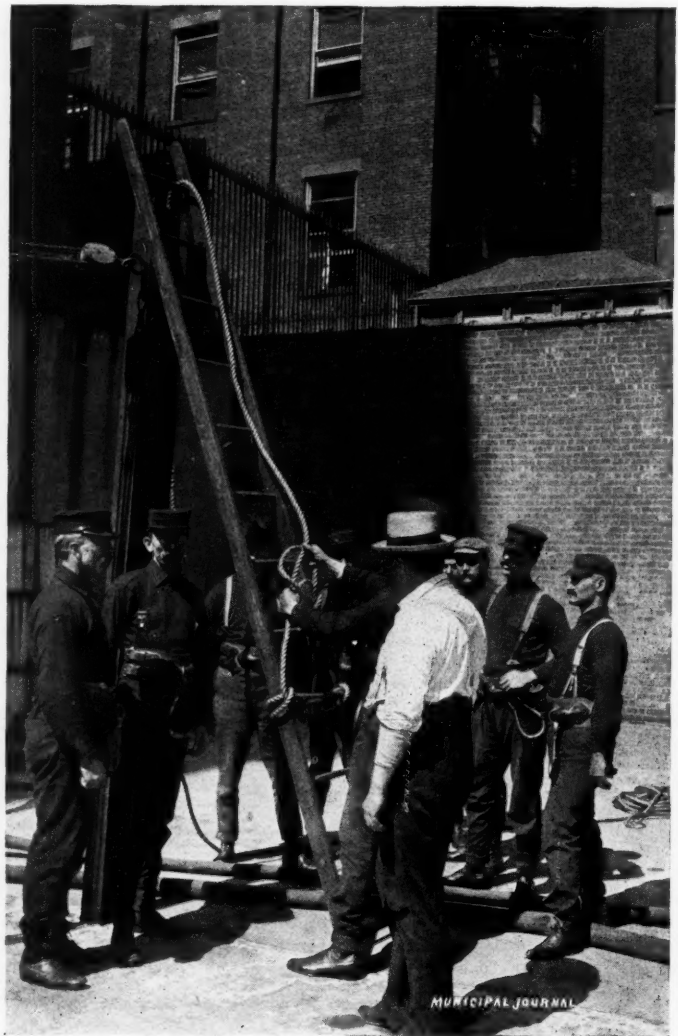
The cost of the new department for the first year amounted to \$936,000, and there were 936 alarms. Much trouble arose from incendiarism as well as with the rowdies and sympathizers with the volunteers, who did their best to cripple the operations of the regulars, cutting the hose at fires and hindering the work in every possible way. The noisy mob that was typical of a fire during previous years was replaced by a body of quiet, orderly men who made no fuss about their work. The first days of the new regime were dark ones for the commissioners, for money was scarce, the opposition strong, and many of the new firemen were in the service because it was a "good thing." During these three years (1867 to 1870), when Gen. Alexander Thaler was commissioner, the department became well organized, disciplined and its success assured.

Boards were organized to examine candidates for promotion and this was made for merit only. Attention was paid to the expenses and the greatest economy was observed. General Thaler organized and taught the officers and men in their duties and began to rid the service of all those who could not or would not learn to be firemen. He set the pace that has been carried on up to the present and which makes the department the fine organization that it is.

Chief Kingsland resigned from the service in 1869 and J. L. Perley was selected to succeed him. The chief's salary was placed at \$4,500 and that of brigade chiefs at \$2,400. In May, 1874, the name "Metropolitan Fire Department" was changed to that of "Fire Department of New York" as it is at present. In 1873 the mayor was given the power to appoint, with the consent of the aldermen, three commissioners for different terms, and whose salaries were placed at \$5,000 and the president's at \$7,000. Eli Bates was made chief on the appointment of Perley as a Commissioner, and served until 1884. At the time of his appointment he had served twenty-seven years as a fireman. Under Chief Bates the

department consisted of about 500 men and there were no paid companies above Fifty-ninth street. The engines and hose were not of the best and the fire alarm system had not reached its present degree of perfection. Chief Bates thought much of the importance of a perfect alarm system and claimed credit for originating the simultaneous alarm. One other reform he instituted. Previously the officers had to send in two alarms before they could transmit the third, but this was changed and, as at present, the third alarm could be sent at once if thought necessary. In 1875 self-propeller steamers were given to four companies and in the same year experiments were made with the new aerial ladder of Mrs. Uda. This resulted in the death of Battalion Chief Nash and two men who were on the ladder when it broke after being raised to a height of ninety-seven feet. It is needless to say that this style of aerial was not adopted.

During the period, 1873-1881, many important changes and improve-



LEARNING TO MAKE KNOTS

ments were made. The water mains were enlarged and a fire marshal was appointed by the city in place of the one previously appointed by the insurance companies. Abner Greenleaf offered his water tower to the fire commissioners, and after a test it was accepted. Water Tower No. 1 was put in service in 1883. This kind of tower was used until Hale introduced his improved device.

#### GAMEWELL FIRE ALARM INSTALLED

The most important improvement that had been effected in the department about this time was in 1871 when the bid of C. T. & J. N. Chester was accepted for installing a complete fire alarm system under an appropriation of \$4,000 for this purpose. This system with minor improvements is that installed by the Gamewell Fire Alarm Telegraph Company to-day, and it was the first time street alarm boxes were placed in New York. In June, 1883, the keyless boxes



were put up, and in August the first attempt was made to place some of the wires underground.

In 1882 there was great demand for an increased water supply in the business districts. The commissioners wanted to build cisterns under the sidewalks to be connected with the water mains. In event of a large fire, the water could be turned into the cisterns and taken therefrom by the suction hose of the engines. It was thought that more engines could get at the water than if connected with the hydrants. Another idea was suggested by Commissioner Henry D. Purroy, who had built a water tank wagon. This was to be filled at the rivers by the fire boats and the land engines were to draw from the wagon when full. A satisfactory test of the wagon was made in March, 1884, and the wagon put in commission. In April of the same year Chief Bates retired and Charles O. Shay was made chief with Hugh Bonner as assistant. Bonner became chief of the department in 1889 and held the position until 1899, when Chief Croker took command.

#### THE DEPARTMENT TO-DAY

The fire department at the present day is under one commissioner, Mr. Thomas Sturgis, who receives a salary of \$7,500. He appoints a deputy for the Borough of Brooklyn at a salary of \$5,000. The commissioner is treasurer of the department and also of the Fire Department Life Insurance Fund and has absolute control of the department. There are three bureaus in the department, one directing the extinguishing of fires in charge of Chief Croker; one known as the Bureau of Combustibles in charge of Inspector G. E. Murray, who executes the laws relating to the sale and use of combustibles; and one to investigate the origin of fires in charge of Fire Marshall Peter Seery and assistants. There is in addition a bureau for the inspection of buildings.

Chief Edward F. Croker has been at the head of the department since July 1, 1899, and has introduced several improvements while keeping the department up to its fine state of efficiency. The search light carried on several of the engines is Chief Croker's invention and has proved of inestimable value in fighting fires at night. It can be removed from the engines and carried up narrow alleys so that the firemen can see to work.



ONE OF NEW YORK'S DOUBLE ENGINE HOUSES  
By courtesy of Horgan & Slattery, New York

At present the department consists of 138 engine companies, including four fire boats, and thirty-four hook and ladder companies. Nine of the engine and three of the hooks are double companies equipped with two sets of apparatus and formed into two sections, one of which remains to cover unprotected property while the other responds to alarms. There are also four water towers, and eleven engine companies in Brooklyn are equipped with hook and ladder trucks. Six engine companies as well as three hook and ladder companies in Manhattan have chemical engines. Engine and hook and ladder companies consist of fourteen men in Manhattan and twelve in Brooklyn. The

salaries of firemen run in four grades from \$1,400 to \$800 per year. Chief Croker receives a salary of \$6,000 and his deputy in charge of Brooklyn \$5,000 a year. The boroughs of Richmond and Queens are protected by volunteer companies. The paid department in the Greater City is divided into sixteen battalions, which are formed into three divisions, each in command of a deputy chief of department. Companies are being added and apparatus purchased as the needs of the city require. Only the best and the most improved apparatus is accepted, and the Chief is ever on the lookout for any good invention in fire fighting appliances that will make the service the most up-to-date. Salt water mains, so that the river water could be used on large fires, is an improvement he has been anxious to have placed in both Brooklyn and Manhattan.



THE CONVENTION BADGE

#### THE TRAINING SCHOOL

One of the most important branches of the department at the present time is the training school, where the men learn to handle the ladders and ropes, to scale the sides of buildings, gain confidence, keep their muscles in trim and so be ready for any emergency. In January, 1883, Chris Hoells, of the St. Louis Pompier Corps, was appointed instructor of the New York Life Saving Corps, a branch of the school of instruction through which all candidates have to pass successfully before being recommended for appointment as firemen. Hoells returned to St. Louis in May and Chief Henry W. McAdams was placed in the position of instructor. Chief McAdams is still the efficient head of this school and has seen it develop into the important part of the department it now is. Here it is that the New York firemen receive the training that makes them known the world over for skill and daring, and to Chief McAdams is due in great part their success. Each company is given a month's training three times a year, while new men must prove their ability to handle apparatus and climb before Chief McAdams will recommend them to the commissioner. Many thousand men have been trained by him and none have been hurt. The men learn quickly, for he is a patient instructor and always has a word of commendation when the men master any movement. Under the gruff exterior is hidden a good nature and humorous disposition that is characteristic.

#### THE CHIEFS' CONVENTION

The chiefs that visit New York during the convention of the International Association of Fire Engineers, September 16 to 19, are sure of a royal welcome and will have an opportunity to see for themselves what kind of a department protects New York from fire. The topics of papers and addresses, previously assigned, are as follows:

"How should firemen be best awarded after having saved human life at the risk of their own?" Ex-Chief A. C. Hendricks, New Haven, Conn.

"Wire-glass windows. Their advantages, if any, over shutters," by Chief Edward F. Croker, New York City.

"Are towns and cities keeping pace with improvements in fire protection, in proportion to the increase of the conflagration hazard?"

"Electrolysis; its destructive effect on gas and water pipes. What steps should be taken to prevent it?" Capt. William Brophy, electrician, Boston, Mass.

"The fire department of the future in our large cities," by Chief George W. Horton, Baltimore, Md.

"The drill school for firemen; its importance and results," by Henry W. McAdams, chief instructor, New York Fire Department.

"Progress in fire alarm telegraphy" (illustrated), by Joseph W. Stover, president, Gamewell Fire Alarm Telegraph Company, New York City.

"Fire-proof paint and wood," by Hon. Perez M. Stewart, Superintendent of Buildings, New York City.

#### PROGRAMME

*Tuesday, September 16.*

10:00 A. M. Meeting called to order; opening addresses.

2:00 P. M. Business session.

8:00 P. M. Reception.

*Wednesday, September 17.*

Whole day devoted to examining and testing fire apparatus and appliances.

Afternoon: Automobile ride for the ladies through the Park and up Riverside Drive, with luncheon at Claremont.

Evening: Theatre party.

*Thursday, September 18.*

10:00 A. M. Business session.

Noon: Boat excursion with music and refreshments. Hudson river, Narrows and Long Island Sound. At the Narrows an exhibition of a fire-boat will be given.

8:00 P. M. Business session.

*Friday, September 19.*

9:00 A. M. Final business session.

Afternoon: Entertainment at Fire Headquarters where an exhibition will be given and the Bureaus inspected.

Evening: Band concert, dancing and refreshments.

Details are being perfected and the Citizens' Committee is leaving no stone unturned to make the convention a success. Bain's 69th Regiment Band has been engaged and will play every day during the convention and accompany the excursion on the boat. The ladies automobile ride is not the least interesting event on the programme. Mrs. Frederick W. Gooderson, chairman of this committee, is making arrangements to serve a superb luncheon at Claremont.

The public will be admitted to the hall each day, except Wednesday, the 17th, which is to be left solely to exhibitors and their tests. Tickets for outsiders will be 25 cents each.

DR. H. M. ARCHER,

*Chairman, Press Committee.*

Secretary Henry A. Hills will be at the Murray Hill hotel, Park avenue and Fortieth street, which will be the officers' headquarters, on the evening of the 15th and morning of the 16th.

## WHAT POLICE AND FIREMEN ARE DOING

### Firemen Demolish Billboards—Proposed International Fire Exhibition—How to Become a Good Officer—Favors Chemical Engines

**YONKERS ENLARGES ITS DEPARTMENT.**—The fire department of Yonkers, N. Y., has been increased by the addition of twenty new men. These men are to form the two new engine companies lately authorized. One company is to be equipped with a Babcock combination chemical engine and hook and ladder truck and the other with a single tank chemical engine. Both are to have three-horse-hitches. This addition brings the number of men in the department up to fifty-nine.

**FIREMEN AS ELECTRICAL STUDENTS.**—Members of the Lexington (Ky.) Fire Department have been educated as electricians by the city. Assistant Chief Sutton, an engineer and two linemen were first to be detailed by Mayor Duncan for this purpose as an experiment. The course was for two years and the progress made justified the Mayor's judgment. It is expected that money will be saved by this course as all electrical repairs can be made by the men. A new switch-board was made by the men while studying.

**HANOVER USES ALCOHOL FOR FIRE ENGINES.**—The chief of the fire department at Hanover, Germany, has constructed an alcohol firing apparatus to be used with the automobile fire engines, of which there are several in the city. The alcohol firing has proved very successful, and another engine with this appliance will be secured. This department has the first automobile fire engines in use in Germany and the abolition of the smoke and noise, which are such disadvantages, placed the automobiles in favor with the authorities.

**FAVORS CHEMICAL ENGINES.**—Chief M. E. Higgins of the Albany (N. Y.) Fire Department, is very partial to chemical engines. He says that the ones already purchased have proven of great value as auxiliaries to the department. Of the 651 fires from all sources during 1901, 271 were extinguished with chemicals without necessitating the use of water. They can respond to a fire with celerity

and reduce the amount of losses for they cause but little damage. Chief Higgins recommends that this kind of apparatus be purchased with great freedom.

**FIREMEN DEMOLISH BILLBOARDS.**—Because the owners of large billboards in the city of Buffalo, N. Y., refused to obey the orders of the Fire Commissioners to remove them or make them comply with the fire ordinances as to height, the fire laddies were ordered to take axes and lay the signboards low. Last May the companies were ordered to take down all boards over seven feet in height. Appeal to the courts resulted in the companies being ordered to take down the signs, but they delayed so long that the Fire Commissioners grew tired of waiting and, after peremptory orders, did the work themselves. The unsightly boards made impossible any attempt at beautifying the city.

**INCREASE IN APPARATUS NEEDED.**—The rapid growth of the city of Alliance, O., has made necessary the addition of at least two engines and a hook and ladder truck to the present fire department. The last report of Chief William August, the department consisted of a chemical engine and hose wagon built by the International Fire Engine Company and a hose wagon. The manual force is made up of the Chief, a captain, two drivers, a hoseman, all of whom are paid full time, and five call men. The fire and police alarm systems are in excellent condition and there are thirty-five street boxes on four circuits. For the last year the department cost the city \$4,780. The Chief receives a salary of \$80 per month and the firemen \$40.

**DUBLIN POLICE WANT MORE PAY.**—The committee of Parliament that was appointed about a year ago to inquire into the requests of the Royal Irish Constabulary for increased pay have been asked to recommend a similar increase in the pay of the Dublin Metropolitan police. The committee found that the pay of the Dublin



police was entirely adequate and sufficient to retain good men in the force. It reported that the Dublin Police, with a strength of about 1,200, acting within an area of 32.15 square miles, among a population of 380,000 persons, claim to be placed upon the same footing as regards pay, allowances, etc., as the London Metropolitan Police, doing duty within an area of 700 square miles, amid a population of over five millions. Commenting on these claims the committee say: "It is needless to remark that, in fixing the salaries and allowances of police forces, regard must be had to local conditions, and that no hard-and-fast rule on the subject can by any possibility be laid down."

**PROPOSED INTERNATIONAL FIRE EXHIBITION.**—The British Fire Prevention Committee will try and organize an international fire exhibition to be held in London, May to October, 1903. Sub-committees to be formed in different foreign countries will endeavor to make the exhibition thoroughly international. It is desired to make the exhibition not only practical and instructive, but an exhaustive picture of everything relating to the subject. A feature will be the question of fire preventive methods of building construction. The London Exhibitions, Ltd., will have charge of the exhibits and will provide floor space for exhibitors at the rate of \$1 per foot with a minimum of \$200. An international congress of experts will be held in connection with the exhibition. Under the division of "Fire Prevention" will be included building construction and equipment, electrical and heating safeguards; fire-extinguishing and life-saving appliances and fire stations and equipment will be included under "Fire Fighting." Other divisions will include "Fire Calls," "Salvage Work," "Ambulance Service," "Water Supply," "Insurance," etc. All additional information can be obtained by addressing The Acting Secretary, British Fire Prevention Committee, 1 Waterloo Place, London, S. W.

**GOOD SHOWING FOR YOUNGSTOWN.**—Chief W. H. Loller of the fire department of Youngstown, O., has made a comparison of the expenses attendant on running the fire department there and in other cities of that locality. Some of the figures given on the relative expenditures are as follows: Canton, with a population of 30,667, expended \$28,545.12 out of an appropriation of \$39,583.74. Akron, with a population of 42,728, expended \$59,494.10 out of an appropriation of \$60,499.78. Dayton's population is 85,333. An expenditure of \$88,703.11 was made, while the appropriation was \$85,730.78. Toledo, with a population of 131,822, spent \$140,079.15 out of an appropriation of \$151,851.76. South Bend, Ind., with a population of 35,999, expended \$40,511.94 out of an appropriation of \$41,816. Youngstown's population, as given at the last census, was 44,885. Out of an appropriation of \$38,716.88 there was an expenditure of \$35,324.28. In few of the other cities of the country have the firemen been so poorly paid. In the east, where the salaries are the smallest, the chiefs of the departments of all the cities of the class of Youngstown are paid at last \$2,000 the year. The chief of the department at Cincinnati is paid \$5,000, Cleveland \$4,200, Columbus \$2,000, Dayton \$2,500, etc. Akron's salary list, however, is smaller. The chief has been getting \$1,000 and the firemen \$62.50 the month.

**HOW TO BECOME A GOOD OFFICER.**—An ordinance, prescribing rules and regulations for the government of the police of Houston, Tex., provides that sergeants shall see each patrolman at least twice during the tour of duty. Officers shall not go into saloons and drink while on duty under penalty of five days' fine for the first, and dismissal from the force for the second offense. Officers must not go off their beats except to render assistance to a brother officer, must not smoke while on duty, must walk their beats and not stand and talk to citizens for more than five minutes, and then to give or seek information only; all under penalty of five days' fine for the first offense, ten for the second and dismissal for the third. Any officer found asleep on post will be dismissed. Each officer must learn to recognize each inhabitant on his beat and must be able to furnish particular information about the state of any portion of his post. The time of the appearance on his post of any known bad character must be reported to his superior. Officers are enjoined

from doing anything more than is necessary for the safe custody of their prisoners, unnecessary violence must not be used nor even language that will provoke a prisoner, and he must not consider he is interfered with unless the interference is active. Patrolmen are not to become offended at any harsh or abusive language that may be applied to them. If all these and other rules are obeyed, the policeman will be considered a good officer.

### An Ideal Fire Escape

THE Kirker-Bender fire escape, made by the Dow Wire Works Company, of Louisville, Ky., is one of the most unique and efficacious appliances in the fire escape line ever placed upon the market. Its simplicity and efficiency will be readily observed by a glance at the accompanying illustration.

It is a spiral slide inclosed in a sheet steel cylinder six feet in diameter with a heavy angle iron ring at the bottom which rests on a brick foundation six feet eight inches in diameter and two feet deep. The spiral slide is made of soft box annealed steel securely and smoothly riveted to the cylinders and supported in center by an iron stand pipe three inches in inside diameter. This stand pipe extends entire length of escape and has brass hose connections at bottom and top. The escape is connected with the building by iron runways which are protected with heavy wire railings. All doors are made in pairs of sheet steel well braced with half oval iron. The entrance doors have projecting frames so that they can open inward and not interfere with the slide. These doors close automatically to prevent entrance of smoke and heat. The exit doors open outward. A very light pressure of any object sliding against it opens an automatic latch on these doors. The slide comes within eighteen inches of the ground. Escaping persons get up as if rising from a chair on reaching the exit.

A sheet steel roof covers the escape which keeps it nice and dry and free from snow and ice which are such a menace to life on all step escapes. The entire work is mechanically and substantially constructed and painted with two coats of best mineral paint.

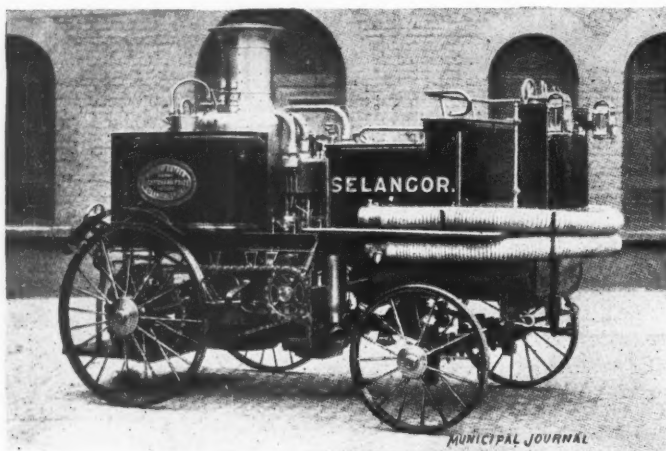
The escape is set between the windows so as not to obstruct ventilation and light.



KIRK-BENDER FIRE ESCAPE

### A New English Fire Engine

THE fire service of the city of London is inadequate and has been for some years. The recent disastrous fire in that city has called especial attention to the needs of the department and the authorities are now pushing preparations to remedy the evil. Like many other cities, it is "locking the barn after the horse is stolen." A local firm has recently put on the market a new motor fire engine, shown in the accompanying illustration. Both the boiler and the engine designed for operating the pumps at the scene of the fire are arranged for the propulsion of the vehicle from the fire station to the place where its service may be required.



AN ENGLISH MOTOR FIRE ENGINE

The boiler is of the same construction as the boilers employed in the ordinary horse-drawn fire-engines. When ready to respond to a summons the engine has about 20 lbs. of steam, with the Clarkson burner so hot that the oil may be turned on at once. At the same time the crank shaft of the engine is in gear with the countershaft. As soon, therefore, as the required 60 lbs. pressure of steam is obtained the vehicle is ready to be started along the road to the scene of the fire. On arrival there the feathered spur wheel on the end of the crank shaft is slid out of gear, the crosshead lowered into its lowest position, each of the pump rods screwed on to it by means of the screw-sleeves, and the engine is ready to commence pumping.

### Garbage Disposal in Zurich

THE collection and removal of garbage in the city of Zurich, Switzerland, is undertaken by the Health Department of that city. The garbage consists of street sweepings and general rubbish, which the tenants collect in boxes and place on the sidewalk early in the morning, twice a week. The city wagons then come around and collect it. In the suburbs, however, the finer material is used by the owners as fertilizers.

The city of Zurich has a population of 160,000, and the amount of rubbish collected amounts to 1,152,027 cubic feet. The coarser material, consisting of glass, crockery, stones, etc., is used to fill in low-lying lands, etc.

Receipts of all sources amounted to \$22,825 and the disbursements \$23,065. There is a tax of about ten cents per room per annum, which is paid by tenants.

The City Council of Geneva sent a commission to the large European cities to study the methods there employed in disposing of garbage. The committee on its return recommended the Lee system of cremation, which is in its main features the same as the Fryer, adopted by the largest cities of England. Consequently all rubbish which is not otherwise used will be cremated.

In 1896 the cost of sweeping the streets and removing the rubbish amounted to \$19,625, which is about 15 cents per capita. The streets being mostly macadam—there are only a few paved—the coarse sweepings, stones, earth, etc., amount to considerable, and are used to fill in streets.

Dead animals, spoiled meat, etc., are collected by the city wagons and buried on city lands set aside for that purpose outside the city limits, and if possible, at the owner's expense.

The sewer system of Zurich was, in 1897, about ninety-three miles long. The main sewer is made of cement pipes to which earthen conduits connect. The waste water from the house, closets, etc., drain into the main sewer, where there is such a connection, otherwise into cesspools. Only liquid matter is allowed to drain into the sewers, the solid substances being retained into the traps and removed by the city wagons.

No disinfection or deodorization of sewage is resorted to before emptying into the river, for the latter is swift, wide and deep. As Zurich is well drained by its two streams and sanitary regulations are strictly enforced, the health of the town is good. Rubbish is not permitted to accumulate in the streets, yards, or anywhere within the city.

## FIRE AND POLICE PERSONALS

—Thomas F. Farnan is Baltimore's new Marshal of Police. Mr. Farnan was promoted from deputy marshal to marshal by the board of commissioners.

—Chief of Police of Joplin, Mo., has been suspended from the police force by the commissioners owing to charges of a serious nature having been brought against him.

—Chief of Police Kiely of St. Louis, Mo., had the honor of receiving the "Order of the Red Eagle" (fourth class) conferred by Emperor William of Germany as a remembrance of his brother's visit.

—William W. Baker, formerly a captain of one of the fire companies of Yonkers, N. Y., has been appointed assistant chief of the department. Chief Baker is the first one to hold this position and is well qualified for his duties.

—Chief of Police Fred. Ames of Minneapolis, Minn., was forced to resign his position by his brother, Mayor Ames, when the latter gave up his office. This is the final result of a long series of scandals in the police department of Minneapolis.

—Fire Chief Dunham of Waterloo, Iowa, has proposed a plan for the retiring of all firemen who have been in service for ten years. His plan does not meet with favor from the members of the department, for many have already served the allotted time and do not wish to leave the department.

—In obedience to directions of the Mayor, Chief Marshall of Lexington, Ky., has resigned his position as chief of police of that city. Chief Marshall says that he will prosecute to a close the suit

brought by him to determine his rights as chief of police, but that until the courts decide upon it he will not obstruct the police authorities in their duties.

—Chief Horton of the Baltimore fire department recently received a present from an unknown friend. It was a pair of link cuff buttons made of gold in the shape of a lion's head. In the mouth of the lion was a beautiful diamond. The sender did not disclose his identity, but it was suggested that the Emperor William of Germany had conferred the honorary degree of "Knight of the Golden Cuff Buttons" upon the chief.

—Chief of Police F. H. Wilmoth, of Elkins, W. Va., was murdered while in the act of arresting two negroes. The third man shot him from ambush. This is the third time that the chief of police from Elkins has been murdered within a year. Capt. J. J. Nallan has been appointed to the position of Chief and the town council has instructed him to take no chances but to shoot to kill upon the slightest demonstration against him.

—Chief of fire department, Joseph Foley, of Minneapolis, Minn., recently informed the council committee on that department that he could run the department to the best advantage and if not allowed to do so he would prefer to resign. The trouble arose over the committee wishing to allow each member of the department a day off each month. Chief Foley claimed that it would cripple the department, which is already too small. The chief states that his life experience in fire matters has taught him what the men want and how they feel about these things.



# LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

## Periodicals

*The Age Herald* of Birmingham, Ala., with its issue of July 20th, published an industrial review which is devoted to the general condition of the city, its growth and progress, and shows how this city, which is not yet forty years old, has increased wonderfully in wealth.

The August issue of the *National Magazine* contains several articles on "Progressive American Cities." *The Metamorphosis of Muskegon*, by Douglas Mallock; *Worcester, Heart of the Commonwealth*, by J. Albert Rippel; *Fond du Lac, a Wisconsin Railway Centre*, by E. M. Jennison; and *North Adams, a City in the Hills*, are the titles. All are profusely illustrated. Boston, Mass. Price per year, \$1; per copy, 10 cents.

*Insurance Engineering* for July contains an article upon the efficiency of sprinkler equipments. This appears as one of the addresses before the National Fire Protective Association, the proceedings of which have been printed in this magazine. This article gives the experience that engineers have had with sprinklers and contains summaries of fires in which these sprinklers have figured and the results achieved. New York, N. Y. 25 cents per copy; \$3.00 per year.

*The Engineering Magazine* for August contains the second paper on *The Economy of Mechanical Stoking* by William Wallace Christie. He shows how a man can handle twice the number of units of horsepower by means of automatic feeders than if he fired entirely by hand. He says that "a mechanical stoker is a most desirable addition to many power plants where very low grades of coal are burned." He gives tables to show the comparative economy of mechanical and hand stoking, etc. While uniform firing is obtained by means of the mechanical stokers, "it must be remembered that mechanical stokers are not smokeless if hard pushed." New York. Price per year \$3; per copy, 25 cents.

THE August issue of *The Arena* contains an article entitled "A Conversation with Prof. Frank Parsons on the Government Ownership of the Telegraph and Telephone." In answer to several questions propounded to him, Prof. Parsons states "If the government determine to own and operate these two monopolies the best plan for it to follow would be to offer the private companies the real value of their systems and pay the amount by means of some sort of progressive taxation upon the monopolies or their owners." He thinks that government ownership would result in a ten cent rate for all business within each state. The experience of Europe proves to him that government ownership is perfectly practicable and the seeming failure of it in England is due to the fact that the government there paid the companies over four times the real value of their wires. New York, N. Y. 25 cents per copy; \$2.50 per year.

In the August issue of the *Review of Reviews* appears an article by Victor S. Clark on *The Cuban Municipality*. Mr. Clark says that the Cuban municipality is a "lineal descendant of the Roman municipality." At that time the city was regarded as the primary element of the body politic, ruling the country as a piece of property. Under this government civilization could not develop representative government. It was not until 1844 that the practice of selling municipal offices to the highest bidder was abolished in Cuba. The author sketches the development of the Cuban city from the earliest date and gives an extended account of the present local government. He tells of the present functions of the mayor and council, how the city is divided into its wards and districts and condition of the municipal franchises at the present time. He seems to think that while

the inhabitants of Cuba are not at present capable of continuing the good government started there, that the influence of the United States will, in the end, educate the people to a realization of the duties of citizenship. New York, N. Y. 25 cents per copy; \$2.50 per year.

*City Ownership of Seaside Parks* is the title of an article by Sylvester Baxter in the August number of *The Cosmopolitan*. After a brief statement as to the necessity of cities owning the nearby seashore for the benefit of its citizens, Mr. Baxter tells how the city of Boston took over Revere Beach and made it a decent place of resort as opposed to the condition of the beach under private ownership. The beach is not only a beautiful place for people to visit, but it has also been the means of profit to the city from the receipts of the public bath houses. Nantasket Beach is also briefly described. This beach is also owned by the city of Boston and has proved a great success under city management. The author speaks of the great chance the city of New York had for acquiring the shore of Coney Island when Mr. Olmstead designed Prospect Park. At that time he included in his system of parks the shore of Coney Island. Nothing was done, however, to take advantage of this, and now the cost would be almost too great for the city to meet. The author concludes the article with a plea for the ownership of all similar seaside resorts of nearby cities. Irvington, N. Y., \$1.00 per year; 10 cents per copy.

## Books

The ninth edition of the *American Street Railway Investments* has been issued by the *Street Railway Journal* of New York, N. Y., as a supplement to that paper. The book contains 31 folding maps, some in colors, of the most important street railway systems in the United States, and a table showing by comparisons the gross receipts of all companies earning \$25,000 or more for the years 1900 and 1901. This edition embraces reports of 1,281 companies showing in detail the physical and financial condition of the properties. The figures are given for all important consolidations which have taken place during the year.

The question of sewage and its treatment is ever one of the greatest interest and importance to the city official for the health of the city is and should be of the foremost consideration. *The Modern Treatment of Sewage*, by H. C. H. Shenton, M. S. E., is a small book of some 109 pages, being a collection of notes made by the author in the course of his experience in sewerage work and reprinted from the *Local Government Journal*.

Chapters I, II, and III consist of notes on the design of sewerage systems. Chapter I deals with the character of the ground, the rainfall drainage, foul sewage drainage, etc. In Chapter II the position, size, number, etc., of the outfalls are discussed, as well as the difficulties as regards outfalls and the methods of overcoming them. Systems of sewers, intercepting sewers and the best course for sewers are some of the subjects treated in Chapter III.

Chapters IV and V deal with the arrangement and construction of sewers and give practical methods of building them. Flushing, ventilation, maintenance and cleansing of sewers form the subjects for the next six chapters. The author says "don't" to many instances of common practice, such as the laying of new sewers with junction pipes provided for future connections. He emphasizes the fact that every inlet sewer ventilator may be a possible outlet.

The last three chapters deal with various systems of sewage disposal, bacterial purification of sewage and the construction of bacteria beds and sewage works generally. A large amount of information is given that is important for engineers to know for it is derived from experience. Published by S. Edgecumbe-Rogers, 2 Dorset street, Fleet street, London, E. C. Price 2 shillings, 6 pence.

## FIRE-PROOF CONSTRUCTION

### Methods in English Cities—Advantages of the New Fire-Proofing Material—Stood the Test in New York City

AMERICAN municipalities are beginning to realize the need of wiser regulations relating to the construction of all classes of buildings. They are following more and more the example of European cities. London, for instance, does not have one-tenth the fire loss of New York city and yet it has a million more inhabitants and covers twice the area. This is due to the rigid enforcement of laws which protect life and property by fire-proofing methods.

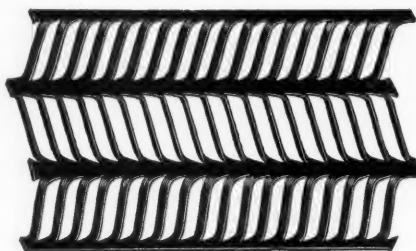
While the municipal authorities on the other side of the Atlantic often lead in civic improvements, after similar improvements have been introduced in American cities it does not take the Yankee genius long to excel in both methods of construction and combinations of material. This is seen nowhere more strikingly illustrated than in the construction of fire-proof partitions after the system evolved by The General Fire-Proofing Company of Youngstown, O. This is called the "Herringbone" expanded metal lathing. The accompanying illustrations and descriptions will give a complete idea of its application to the construction of buildings, to the smallest dwelling as well as to the largest office or public building.

This metal lathing, of course, will not burn. It does not buckle and there are no sags and no pulling or stretching detected in its application to construction work. Much labor is saved in its use for it is easily applied. There are no strips required for it is self-furring. It is easily handled for it is so rigid that it does not require a man at each end of a sheet to apply it. It is economical because it saves plaster. It has a perfect key and is vermin-proof as well as fire-proof. Rats and mice cannot gnaw through it. It forms the best foundation for high price decoration of interior walls, and when plaster is laid on the "Herringbone" expanded metal the surface will not crack.

A test of this metal lathing was recently made in New York by the Department of Buildings in the Borough of Manhattan, under the direction of Messrs. Miller & Schwartz, engineers of the department.

Upon a 12-inch thick dwarf wall, 2 feet 4 inches above the ground,

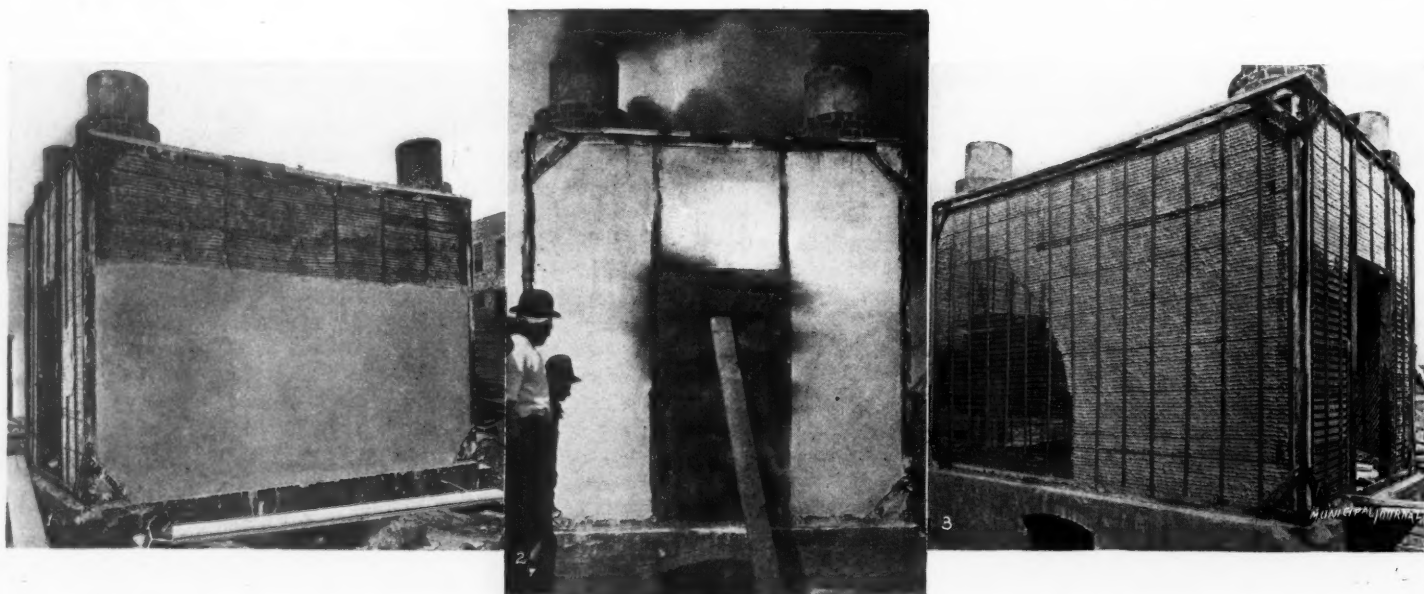
On one side of this frame work or kiln was enclosed with a partition composed of metal uprights, 1 inch by 3/16 inch, spaced 12 inches on centres, and covered with this expanded metal, and weighing 5 1/3 ounces per square foot. It is made in sheets 96 inches in length and 14 inches in width, and expanded, with slitted openings, 1 inch long and 1/4 inch wide, the slitted openings being arranged in rows separated by longitudinal ribs extending the entire length of the sheet. From this main rib the slitted openings are slanted in opposite directions, thus giving the structure the form of a herring bone.



METAL LATHING

The sheet metal from which this material is manufactured is No. 28 gage, United States Standard, and weighs 5.62 pounds per square yard. The lath was fastened to the aforesaid metal uprights with 18-gage tie wire, and the whole was covered with cement plaster to a thickness of 2 1/4 inches.

The other side of the kiln was enclosed with a partition made of what is designated as a "Herringbone Truss," fastened to 1 1/4-inch "T"-irons, spaced 24 inches and 48 inches between centres. This material is made by slitting a sheet of metal in rows and then depressing every alternate row, thus making a series of small trusses,



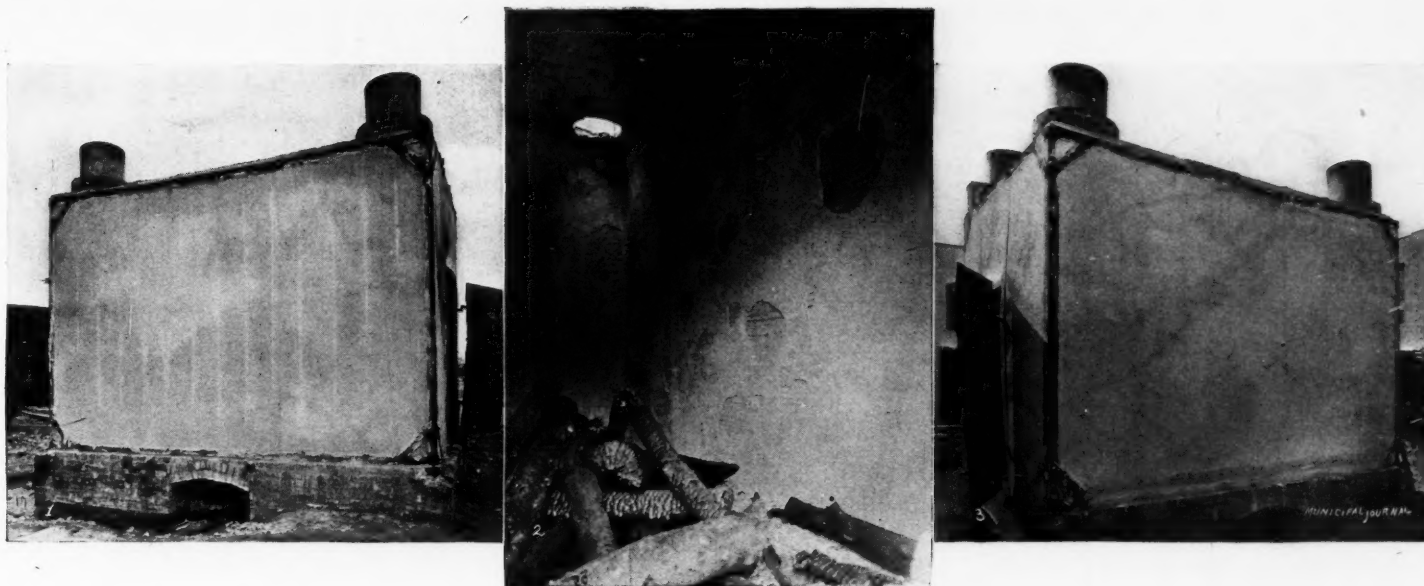
1. EXTERIOR SHOWING KEY AND PLASTERED SURFACE OF TRUSS LATH ON 24 IN. AND 4 FT. CENTRES. 2. KILN DURING PROGRESS OF FIRE. 3. METHOD OF CONSTRUCTION AND KEY OF "A" LATH.

laid in cement mortar, and having four draught openings, one on each wall face, extending from the ground to the bottom of 1/2 to 3-inch iron grate bars spaced 6 inches on centres, an angle-iron framework was built to hold the partitions containing the "Herringbone" lath for the fire test. This framework has two sides, 14 feet 6 inches long and 9 feet 6 inches high.

connected with one another by a rib of metal, the effect being to create a structure of great strength, into which mortar or plaster will securely lock.

This "Truss" material is made of No. 28 gage United States Standard steel sheets, and weighs 5.62 pounds per square yard. It was fastened to the aforesaid "T"-iron uprights with No. 18 gage





1. WEST WALL AFTER FIRE. 2. INTERIOR AFTER FIRE—HOW TRUSS WALL WAS AFFECTED BY HEAT AND COLD. 3. EAST WALL AFTER FIRE

tie wire, the whole being covered with plaster to a thickness of  $2\frac{1}{2}$  inches.

On May 29, at the foot of East One Hundred and Fifth street, the partitions were subjected to the continuous heat of a wood fire for one hour, averaging 1,700 degrees F. for the last forty-five minutes. The details of the temperature readings are as follows: The fire was started at 2.10 P. M. and the temperature readings were as follows: 2.16 P. M., 1,220 F.; 2.20 P. M., 1,652 F.; 2.28 P. M., 1,670 F.; 2.36 P. M., 1,859 F.; 2.40 P. M., 1,814 F.; 2.44 P. M., 1,697 F. Fuel added, 2.48 P. M., 1,859 F.; 3.02 P. M., 1,715 F.; 3.08 P. M., 1,670 F.

At the end of the heat test a stream of water was directed against the inside, discharged through a  $1\frac{1}{8}$ -inch nozzle, under hydrant pressure, for  $2\frac{1}{2}$  minutes on each partition. During this time the partition remained in such a condition that no fire or water passed

through any part of the same; the exterior showed practically no effect from the fire and water; the interior showed that an area of plaster had been burned away to a depth of about  $\frac{1}{2}$  inch.

"We would respectfully recommend," said the engineers, in conclusion, "that the above construction be approved for use as interior fire-proof partitions, enclosures for elevator, dumbwaiter and light shafts and bulkheads, under the respective provisions of the code, when constructed as tested, on condition that each story of partitions and elevator shafts be self-supporting; the partitions to be properly braced vertically; all elevator shafts to have angle-iron constructions at the corners and openings of same, properly framed; that dumbwaiter shafts be not allowed to be built over 45 feet in height without angle-iron construction, and that in bulkheads the roof of same be supported independently of the partition construction."

## THE USE OF FIRE-PROOF MATERIAL

Of the many problems connected with municipal affairs none is worthy of more careful and earnest attention than that which has to do with the building department. American cities have much to learn in this regard from foreign municipalities. In Europe the rules and regulations relating to the construction of all manner of buildings are much more strict and rigidly enforced than can be said of any American city.

Happily for the present and future generations the advantages of using fire-proofing material in the construction of all buildings within the city limits are now being realized. But there is still a great chance for improvement in this direction, and city officials cannot be urged too earnestly to take heed to their building laws. The chief executive of any city where the rules and regulations for building are incomplete has a fine opportunity to make for himself a lasting reputation by instituting a reform. The larger cities of the country have recognized this feature and the authorities are becoming more and more exacting in building provisions.

For this reason such fire retardents as lith should be adopted in all school buildings not only on the merits as a fire retardent but on its superior qualities as a sound deadening. To these characteristics it possesses one which makes it the most valuable material to be used in the construction of all public or even private buildings where it is desired to secure privacy. Partitions which are lined with this material, owing to its being a most valuable non-conductor of sound, make it impossible for the occupants of one school room to be disturbed by those of another on account of the sound passing through the partition.

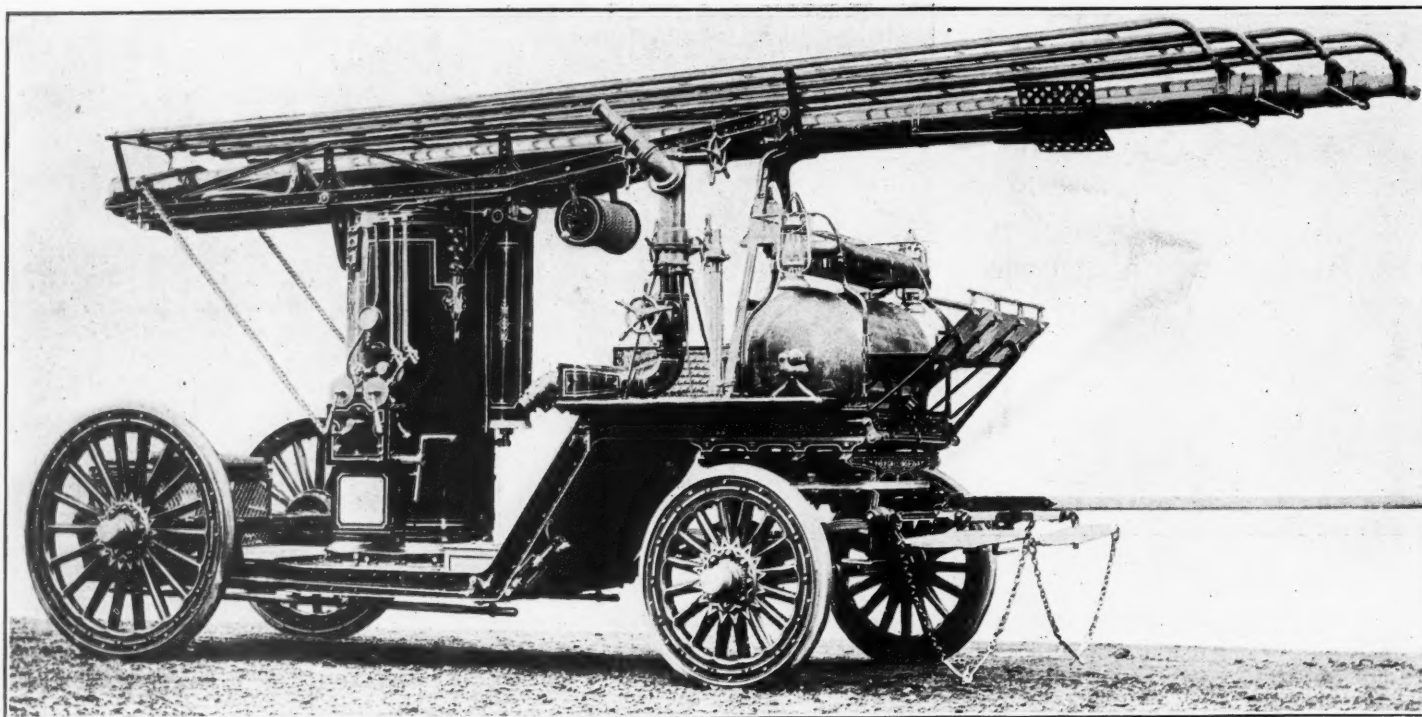
Our readers will be interested to learn something of the composition of this material. The ingredients employed in its manufacture are rock wool with a flax fibre binder, and it is made up in the form of blocks or boards and can be readily adapted to any and all building purposes. Further information upon this subject can be secured by writing to Mr. Robert A. Keasbey, 83 Warren street, New York City.

## EFFECT OF RUBBER TIRES ON FIRE APPARATUS

It was long since a recognized fact that by the equipment of these tires on fire apparatus a great saving is effected in the cost of maintenance. The experience of the London cab-owners, whose records of every cost are carefully kept, is a proof of this; and they find that cabs with rubber-tired wheels suffer very much less than those with iron-tired wheels, every part that could be loosened or broken by constant severe vibration remains tight very much longer. The breakage of lamp brackets, hangers and other parts does not occur, and that even

the varnish, which being hard and breakable, lasts a good deal longer. The saving in first cost and maintenance is 35 per cent, and the saving in keep-up of fire apparatus is greater still.

These facts will be of double value in that the majority of fire apparatus is mechanical and composed or equipped with machinery. Therefore if the equipment of rubber tires on cabs effects such great economy in maintenance, it is apparent that the equipment of endless solid rubber tires on fire apparatus would effect much greater economy on



A HEAVY PIECE OF FIRE APPARATUS FITTED WITH GOODYEAR RUBBER TIRES

account of the high speed with consequent accompanied vibration that the latter is subjected to.

The engine or truck in going to a fire must necessarily take the shortest route and very often this is the roughest. If the wheels are equipped with the Goodyear endless solid rubber tires the vibration is taken up by the rubber and the strain on the apparatus greatly reduced. On account of the easy running the men are more comfortable and not liable to be jarred off, thus avoiding accidents. With these tires equipped it is much easier to steer trucks where wheel steering is used on account of the complete absence of skidding of the wheels. These tires are of exceptional value to such apparatus as aerial trucks which, on account of their peculiar construction, are top heavy and consequently more liable to slew around.

This is said to be the only rubber tire that is not affected by the brake. No matter how often or how hard it is applied it will not cause the tires to slip or creep on the wheel. The reason of this is that every few inches through the tire is a bolt which anchors it securely in place. Neither is it possible to twist the tire off the wheel when caught in the frogs of the street railway track.

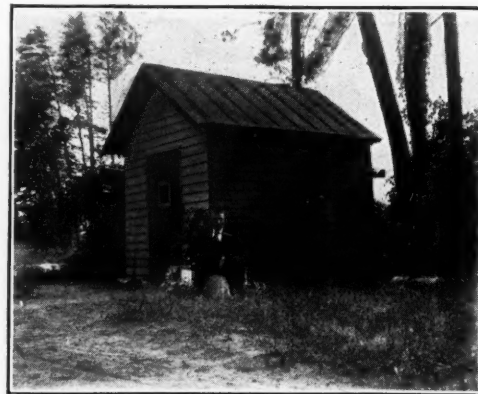
A very important point not to be overlooked is that the flanges which are bolted around each side of the felloe to hold the tire in place greatly strengthen the wheel so that a broken wheel is practically an impossibility.

These tires have been on the market for three years and not one tire equipped on apparatus during this time has worn out, been repaired or given the slightest dissatisfaction.

## THE OLDEST FIRE STATION IN AMERICA

THE town of Mount Holly, Pa., boasts of possessing the oldest fire station in America. This building was erected in 1798 and housed the first engine purchased by the fire company of the town. Mount Holly recently celebrated its 150th anniversary with proper ceremonies, and the historian of the Relief Fire Engine Company No. 1 read a complete history of the organization up to the present time. This company is claimed to be the oldest fire company in America, having been organized the 11th of July 1752. At first the company was equipped with buckets, four ladders and four fire hooks, which were paid for out of the common fund. When a cry of fire was heard at night two or more lights were set up in the windows of the house of the members of the company. For non-attendance at fires a fine of five shillings was imposed. One of the articles of the organization provided that the company should render to the widow equal attention in fire matters as though the husband were living. Another article stated that the ladders and hooks should be kept ready at the town hall, and a fine of ten shillings imposed for any member removing them for other than fire purposes. In 1765 the company agreed to purchase its first fire engine at a cost of \$170. This engine was sold in 1785 and a more suitable one was purchased for \$300. In 1798 the necessity of building an engine house was called to the attention of the company and a committee was appointed to procure a convenient place in a central part of the town and build or purchase a house suitable for the engine, not to exceed twelve feet square. This house was built at a cost of \$145.

Some years later, in 1822, this engine house was removed from its first position and extensive repairs were made. In 1827 the old house was sold at auction and brought the magnificent sum of \$12. This

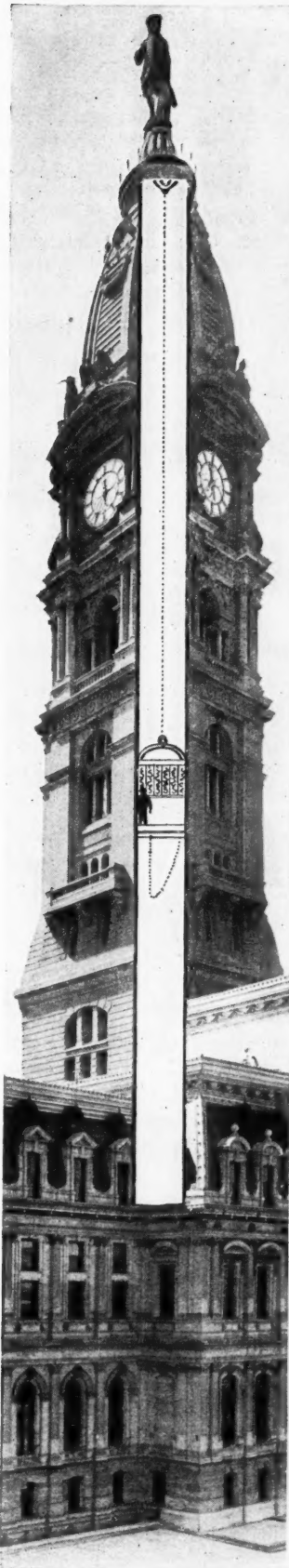


OLDEST FIRE STATION IN AMERICA

house still does duty as a tool-house in the graveyard of one of the churches, and while it is somewhat altered in appearance the frame work is intact, as are also the rear weatherboards.



### Unique Installation of Air Cushion



A NEW elevator will be installed in the tower of the City Hall in Philadelphia this month. The old one was considered unsafe. The Ellithorpe Safety Air-Cushion Company of New York installed its air-cushion, which makes the new elevator system absolutely safe, as will be demonstrated by the test this month when a car with pails of water, eggs and live mice will make the descent, landing on the air-cushion at the bottom without damage to anything. This is the longest drop ever made in the world, the elevator falling 372 feet 9 inches.

A cushion of this character was made doubly necessary in this instance by reason of the fact that immediately beneath the flooring of the elevator shaft is located what is called "Conversation Hall" of the City Council, and in the event of an accident befalling the car the latter was liable to crush through the ceiling of this handsomely decorated apartment and cause considerable damage, not to mention the possibility of sacrificing human life.

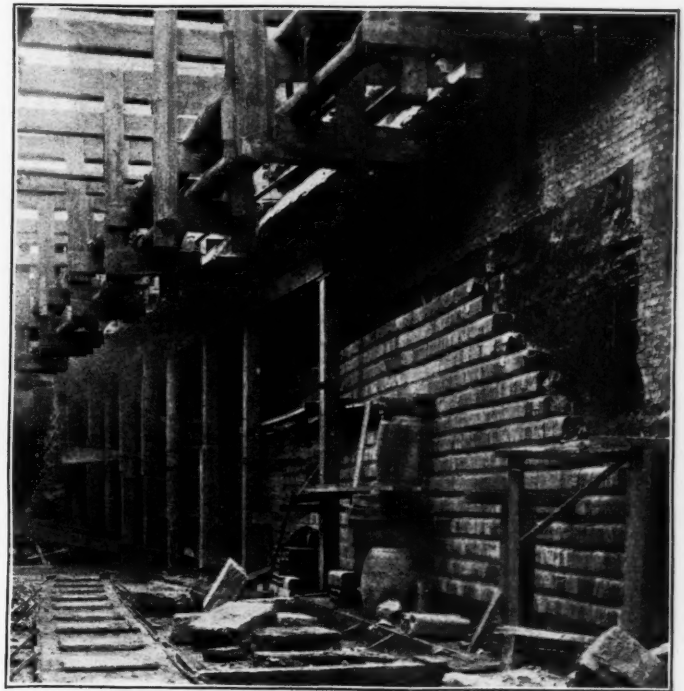
The solution of this problem was found in the use of the air-cushion. This cushion consists of sheet iron, and extends from the seventh floor of the building, the entrance to the tower, to a height of eighty-five feet, being built in such a way that it is suspended. The bottom of the cushion is twelve feet from the ceiling of Conversation Hall. It is the first suspended elevator air-cushion ever placed in position in this country, and its satisfactory operation, when tested this month, is sure to be gratifying not only to its inventor but to all city officials in Philadelphia.

Visitors desiring to view the city from the base of the Penn statue will travel, as they do now, 127 feet  $2\frac{1}{4}$  inches by the regular elevator service to the seventh floor. Here they will change cars, and by means of the new elevator in the tower mount 372 feet 9 inches to a point ten feet below William Penn's toes. From thence, if they have a mind to, and can secure the needed permission, they may climb by ladder almost 47 feet further heavenward, to the

rim of "Father Penn's" hat. From the pavement to the crown of Penn's headgear is exactly 547 feet  $11\frac{1}{4}$  inches. Why the builders of the tower stopped three-quarters of an inch short of 548 feet nobody knows. There will be stopping off places at the big clock, 361 feet above the pavement, and other points en route, and the safety of travelers from accident due to falling of the car is insured by an 85-foot air well at the base of the elevator shaft.

### A Vitrified Conduit System

THERE are many interesting problems in connection with the building of New York's rapid transit subway, not the least of which is to be found in the methods of installing the vitrified conduit system. The solution of this particular problem is made easy by the inventor and manufacturer. The product of the Standard Vitrified Conduit Company of New York is used in the construction of this conduit system and enables the contractor to readily overcome all difficulties.



CONDUIT SYSTEM IN NEW YORK SUBWAY

The conduit shown in the accompanying illustration was designed and manufactured under the personal supervision of Mr. R. W. Lyle, President and Manager of the company, and Mr. B. S. Barnard, Vice-president and Secretary. The picture shows in an interesting way the methods of installing the system. The portion shown here is only partially completed, as the plans and specifications call for the laying of conduits to the top of the subway, 128 conduits of the four multiple type being used to complete both walls of the tunnel.

### Sewage Reduction

THE new septic tank erected by a Chicago company for the reduction of sewage from the Courthouse in Clayton, Mo., was recently completed and turned over to the county for operation. The tank was erected at a cost of \$2,750 and is situated in the public park just south of the court house.

It is claimed by D. H. Wyllie, the contractor, that the plant will purify between 10,000 and 15,000 gallons of sewage a day. The sewage is reduced by the aid of microbes. The idea is a new one in St. Louis County, and Presiding Judge Wilson of the County Court thinks that if it proves to be feasible it will be generally adopted in the county where the sewage problem has become a serious question on account of the rapid increase in population.

Light and air are excluded from the tank. The sewage enters through submerged inlets, so that the contents are disturbed by the inflow as little as possible; the outlet is a slotted pipe through which the effluent passes to a system of contact beds and filters, which are filled and emptied automatically. From the filters the filtrate passes along to the outlet to be discharged pure and without odor.

"This transformation," said Mr. Wyllie, "from crude sewage to pure water is due to the application of natural laws and the indescribable activity of microbes, developed under peculiar conditions. We have heard so much of microbes in connection with all kinds of disease that we usually regard them as an enemy of mankind. There are, however, microbes and microbes, one the destroyer, another the savior of mankind."

"The microscopic germs of animal life are manifested to a large extent in sewage. The organisms are of two kinds; first, the anaerobic or putrefactive microbes, which multiply in the absence of air and light, exercising a deoxidizing action; second aerobic microbes, that thrive in light and air, and exercise an oxidizing action, completing the purification begun by their dark loving neighbors. Nearly all disease germs are aerobic; the anaerobic conditions developed in the septic tank are, therefore, calculated to destroy them and, should they escape from the tank they are destroyed by contact with the aerobic conditions furnished in the filter beds.

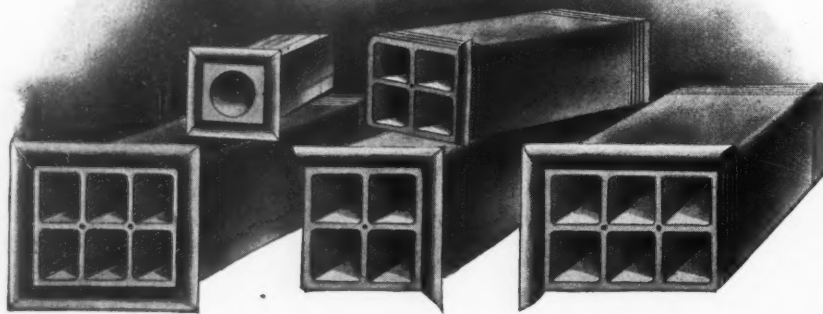
"When the sewage reaches the tank the solids are separated and retained, settling to the bottom or rising to the surface, according to their specific gravity; and the organic matter is acted upon by the liquefying micro-organisms present, by which it is broken down into gas and water. Freed from the solids the partially purified sewage passes off through a slotted cast-iron pipe laid horizontally across the end of the tank, under the water level, into a collecting channel. From the tank the sewage is delivered automatically into bacterial filter beds, filled to a depth of four feet, with crushed and screened furnace clinker. The effluent from the tank remains in each bed from two to four hours, during which time the impurities present in solution are removed by the bacteria, which have accumulated in the filtering medium. Then a discharge valve opens and the filtering liquid escapes, drawing down after it a supply of air into every crevice, thus rendering the filters self-cleansing. No chemicals are used, the work being one of nature."

The system was first introduced in Exeter, England. A bottle of the effluent from a tank in Glencoe, Ill., is on exhibition in the county court room in Clayton. It is as clear and as odorless as spring water.

Further particulars may be learned from the Cameron Septic Tank Co., 812 Monadnock Block, Chicago.

### Electric Conduits in Cincinnati

One million two hundred and fifty thousand feet of electric wire conduit, covering forty miles of street, were recently laid in Cincinnati by Mr. G. M. Gest. The Cincinnati *Inquirer* said the other day in regard to the matter, "The whole work has been done most expeditiously, and considering the shortness of time in which the



THE KIND OF CONDUIT LAID IN CINCINNATI

work was to be done the contract has been carried out marvellously well." General Hickenlooper said, "Mr. G. M. Gest, the contractor from New York, who has executed this piece of work, has handled the business very well, and he has done the work with the minimum of inconvenience to the public. His arrangements for covering the excavations at most frequented crossings, and his use of bridges over the trenches at street crossings, have been productive of the best results. Mr. Gest deserves a great deal of credit for the way in which he has carried out the enterprise. In it one of the largest undertakings in the way of making conduits that has been done in any of the large cities."

### Shade Trees in Paris

THE city of Paris, France, spends about \$90,000 every year in maintaining its trees. There are about 87,600 trees in the city and they grow in rows along the sidewalks. This number, however, does not include the trees in the parks or squares. To care for these trees a corps of inspectors is constantly on the watch. The soil about them is frequently renewed, and iron guards are placed around young trees to protect them. To prevent the injury to trees which is caused by the asphalt and sidewalks shutting out the water, a circle of at least nine feet in diameter around the base of each tree is kept free from asphalt or any pavement. This circle is generally covered with an iron grating. The trees are watered by the street hose and large excavations are made around the trees so that the water can collect about the base of the trunk and percolate to the roots. Many kinds of trees are planted but horse chestnuts are great favorites because they put forth their leaves so early in the year. It has been calculated that Paris has at least one tree for every one of its inhabitants, and the city officials fully appreciate the great good that the trees do toward improving the health rate. To approach the standard that Paris has set with respect to trees, New York should plant over 104,000 trees in its streets; Chicago should have over 51,000; Philadelphia over 39,000; St. Louis over 17,000; Boston over 16,000; Baltimore over 15,000. This number of trees refers only to those on streets and at the Paris street rate of one for every 3.3 of its inhabitants.

### The Superlative Railroad

ONE never tires in riding over the four-track railroad of America, because it is superlatively great in every respect. It has the smoothest roadbed, the most comfortable coaches, the finest service, the most thoughtful attendants, the most picturesque scenery, and it makes the fastest time, all things considered, of any railroad in the world.

Between New York and Albany the traveler is beguiled by the charming scenery along the Hudson and entranced by the distant views of the Catskills on the left and the Berkshires on the right. Thence the way leads through the famous Mohawk Valley and so on across the Empire State, the scene changing momentarily as the train glides over the shining steel rails with the swiftness of the eagle. The new station at Albany is a striking evidence of the progressive spirit which animates the management of this great railway system. Designed first for the comfort of the public it yet has an artistic value largely enhancing the civic beauty of the town. Millions of dollars are annually expended along the line. Buffalo is likely to profit next, as rumor has it that a new central station will be erected there in the near future. In traveling from east to west, or vice versa, he who consults his taste, convenience and comfort, will purchase his ticket over the New York Central, the superlatively great railroad of the world. For particulars address Mr. George H. Daniels, G. P. A., New York City.

### A Street Sweeper That Cleans

THE Oastler "A. B. C." street sweeping machine, which is illustrated with this article, is built of iron and steel and is the result of many years of careful and intelligent study.

Permanence and usefulness combined with efficiency and simplicity have been the guiding rules in the construction of this machine and the reputation which clings to this "A. B. C." sweeper, for durability and clean sweeping, has given it a position which the manufacturer is justly proud of.

The machine sweeps a width of 7 feet 6 inches. The patented broom, which is concave from end to end, and consequently fits the convexity of the road much better than a right line broom, is placed at a more acute angle than the broom in other sweepers, and the consequence is that vastly cleaner sweeping is done.

The broom is kept clear of the pavement, when the machine is not sweeping, by a spring acting automatically when the notched lever is



loosened. A slight pressure only is needed to bring the broom in contact with the pavement, and this pressure can be regulated by a lever working in a notched quadrant similar to the reversing lever of a locomotive.

A patent chain stretcher is affixed to the machine which aids most effectually in keeping the machine steady on the road. The driving chain is made of steel links and couplings, an arrangement which is far more durable than the malleable iron chain generally used. The



castings are semi-steel and the whole construction of the sweeper giving it a durability which has helped in a marked degree to establish for it an excellent and unusual reputation.

Cleveland, Ohio; Cambridge, Mass.; Atlanta, Ga.; the Department of Street Cleaning, Brooklyn, N. Y.; the City of Fall River, Mass.; Troy, N. Y.; Rochester, N. Y.; and hundreds of other cities are successfully using the "A. B. C." sweeper. W. C. Oastler, of 156 Fifth avenue, New York City, is the patentee and manufacturer.

#### Test of Fire Engine in Springfield

THE new fire engine recently purchased by the city of Springfield, Ohio, from the American Fire Engine Co. was tested on August 12th with the most satisfactory results. It is a second size "Metropolitan" engine with a pumping capacity of 700,000 gallons a minute and weighs about 7,500 lbs. The test was conducted by John P. Ahrens, of Cincinnati, who came all the way from Dallas, Texas, to make this special test.

The test at Springfield was made at the Lowrey in the Esplanade. In three minutes after firing there were ten pounds of steam and Mr. Ahrens started the flow of water in 5  $\frac{3}{4}$  minutes. First, a stream was thrown over with an  $1\frac{1}{8}$ -inch nozzle and then two streams of the same size. Then  $1\frac{1}{4}$ ,  $1\frac{3}{8}$ ,  $1\frac{1}{2}$  and  $1\frac{3}{4}$ -inch nozzles were applied. In every case the water was sent to the top of the tower of the city building, a distance of 150 feet. The second test was made in the vicinity of the Court House, where the water was taken from a cistern and a  $1\frac{1}{4}$ -inch stream was thrown over the building. Next the engine was moved near to the St. Joseph Catholic church, a  $1\frac{3}{8}$ -inch stream being sent 15 feet over the steeple. The last test was made at the shops of the Foos Manufacturing Company, where two streams of  $1\frac{1}{8}$  inches each were thrown. Here the water works pressure was tried. It forced the water one-third as high as the engine. At no test was the water pressure below two hundred pounds, and when the hose was forced off the engine in East street the water pressure was about three hundred twenty-five pounds. The police and fire boards met later and formally accepted the engine.

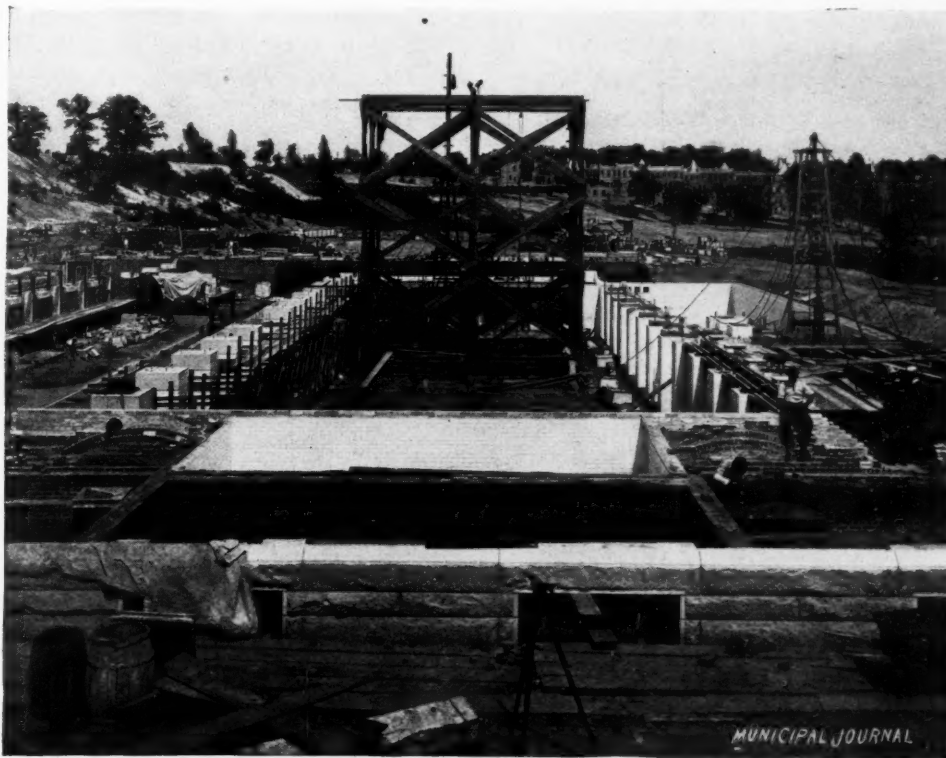
#### Rubber Tires on Fire Conveyances

ONE of the most interesting exhibits arranged for at the meeting of the International Fire Chiefs in this city this month consists of a complete line of rubber tires and ball bearing axles. The exhibit is made by the Consumers New York Rubber Tire Company, of 115 West Thirty-eighth street, which is the local selling agent for the Standard Anti-Friction & Equipment Co. of 50 Broadway, New York City. The Empire ball bearing axles and rubber tire exhibit is in charge of A. L. Farnsworth, general sales agent. These tires and axles are in use by the Chicago fire department and have been adopted by the New York fire department, besides being in extensive use throughout the country.

The makers of this tire claim that "It will stand firmer on the ground owing to the full construction, obviating the tremble sidewise which is incident to the old style of tires," said a member of the concern. "These superior points of construction prolong the life of our tires, as we have less action than the old styles, and as action in rubber is like bending steel, weakens and finally breaks it and takes from it life; hence the claim for longer service, which to the user is of vital importance. Our fastening has no equal. The band principle is the correct one, proved by actual tests; bands cannot sink in the rubber as the wires do. Our bands beaded on the outer and under side, give sufficient strength to outlive the tires, cannot cut edgewise and the bearing in drawing up the bands to tighten the rubber, bring the pressure on the beads, lessening the adhesion, making it possible to draw the bands tighter than with the flat band; they are, in our opinion, preferable to a full round edge because the less opening on the side of a band, the less possibility of the rubber tearing on a severe strain which often occurs in the use of rubber tires."

#### Washington's New Pumping Station.

THE city of Washington is building a new pumping station which will add greatly to the efficiency of the water system. The building containing the power plant will be 250 feet 6 in. in length by 165 feet 9 in. in width. Everything about the plant is to be modern and up-to-date. As an evidence of this, English size of enamel brick are used for facing the interior walls of the engine room, and also for the auxiliaries and vault. A total of 125,000 brick were used for this purpose. The size of the engine room is 101 feet 8 inches by 193 feet. The building will cost \$350,000 and with equipment \$750,000 to \$850,000.



ENAMELED BRICK USED FOR INTERIORS

### Ornamental Entrance Gates

MANY public parks are spoiled in the making. This is due to a vain desire to improve on nature's work. There is one part, however, in the creation of a park in which the artificial should be prominent, and that is at its entrance. The park superintendents and other city officials who are interested in local improvements, will be greatly pleased with the work of the J. L. Mott Iron Works of



84 Beekman street, New York city. It has recently issued an illustrated catalogue descriptive of entrance gates, railings, etc., to be used about public parks, squares, buildings, and the like. This well-known concern not only furnishes a large list of beautiful catalogues from which to make selection, but is prepared to furnish special

designs for any class of work. The designs of architects are carried out with promptness and fidelity.

### The Rhine of America

THE beauties of the majestic Hudson River cannot be fully appreciated and enjoyed unless one views them from the deck of the Hudson Day Line steamers. Those who have seen both declare that the German Rhine is surpassed by the American. The German river is insignificant in comparison with the noble Hudson. Those persons who have never taken the trip up or down the Hudson in the day time can have little appreciation of what they miss, and those who have enjoyed it once are even more anxious to make it the second time. It is ideal in every way.

The managers of the Day Line steamers have anticipated every wish of the traveler so that from the time he leaves New York until he arrives at Albany he can scarcely express a desire for anything which is needed to complete a perfect enjoyment of the journey that has not already been provided for him. The steamers are luxuriously furnished with easy chairs, settees, *tete-a-tetes* and lounges. For those who do not wish, or are unable to enjoy the view from the upper deck, the main cabin is so arranged that the invalid or the persons who wish to remain inside can view the sweep of landscape upon either side of the river protected from the wind and sunshine. The interior of the main and other cabins is furnished with a number of fine paintings and statuary—real works of art—some of which are noted originals. Music is also supplied to add to the pleasure of the tourist.

Even the time spent at meals—and the very best are served in the dining saloon—the traveler is permitted to enjoy the scenery on either side, as it is located on one of the upper decks surrounded with plate glass windows, through which the passing panorama can be readily seen. If you have never made the trip up the Hudson on the Day Line do not let this charming summer pass without giving yourself an opportunity to enjoy it to the fullest extent. For particulars as to time tables, terms, etc., address Mr. F. B. Hibbard, G. P. A., Desbrosses street, New York City.

## NOTES OF INTEREST TO THE TRADE

—G. M. Gest, conduit contractor, of New York city, has been awarded the contract for the additions to the underground subway system of the Edison Illuminating Company of Brooklyn.

—The engineering department of the city of Baltimore recently tested a concrete slab reinforced with expanded metal made by the New York Expanded Metal Company. The test was satisfactory in every respect.

—The Eureka Fire Hose Company, of New York, one of the oldest concerns of manufacturing hose in the country, recently issued two handsome catalogues, one of 32 pages with cover, and another of 64 pages, in which a history of the company is given and a "story" about the evolution of fire hose since its origin up to the Twentieth Century is interestingly told. Besides this, as a matter of course, the various brands of hose are fully described and other appliances used in connection with hose in large public buildings and fire departments.

—The modern equipment of the New York Stock Exchange is made complete and up to date by the installation of a filter plant by the New York Continental Jewell Filtration Company, of 15 Broad street, New York city. This company reports an extremely active business in filters for water works, manufacturing businesses, etc. They have recently completed filter plants for the Beaver Falls Water Co., Beaver Falls, Pa.; St. Andrew's Academy, Poughkeepsie, N. Y., and have just received a contract for the installation of a filter in the new Y. M. C. A. building in West Twenty-third street, New York.

—Asphalt companies outside of the trust are securing their share of work this season and at fairly good prices as compared with some at which the trust has been obliged to take work in order to get it. The Green River Asphalt Company of New York has recently been

awarded contracts as follows: Lincoln, Neb., 20,000 square yards; East St. Louis, Ill., about 6,000 square yards; and in Decatur, Ill., this company was the lowest bidder on about 10,000 square yards, and it expects to receive the contract. At Evansville, Ind., White & Eiche, received a contract for 15,000 square yards to be laid with Kentucky rock asphalt.

—The Standard Roller Bearing Company, of Philadelphia, Pa., having found its present facilities inadequate to meet its increasing business, has purchased a large piece of trackage property near the centre of the city, on which it will build a very large factory for the manufacture of roller bearings. It has also recently purchased the complete plant and equipment of the Roller Bearing and Equipment Co., of Keene, N. H., and also of the Grant Roller Bearing Axle and Wheel Co., of Cleveland, O. This will give it large control over the roller bearing field of the United States. It will move into its new factory about the 1st of October.

—The Diggs Fire Extinguisher Company report an unusually active business for this season of the year in its line of fire extinguishers. The Diggs-Upright extinguisher has met with unprecedented favor and the demand for it is constantly increasing, not only in this country, but abroad, South Africa and Australia parties having placed orders recently, and the company now has in process of manufacture a large order for special sizes for Mexico. These machines are now being made in 1½, 3, 5, 30, 40 and 50-gallon sizes. The device for sealing the acid receptacle and releasing the acid automatically seems to have solved the problem of how to keep the two chemicals used in an extinguisher in close proximity and yet absolutely safe from mingling except at the will of the operator of the machine, and then to bring them together with certainty and quickness.



# LATEST NEWS FOR CONTRACTORS

## Bids Wanted for Municipal Work—Franchises Granted—Contemplated Improvements— Contracts Awarded

### PAVING

Elizabeth, N. J.—The question of paving Fulton street has been under consideration.

Williamsport, Pa.—Bids are wanted September 5th for paving certain streets. F. A. Snyder, City Engineer.

Findlay, O.—The paving of Defiance avenue, at a cost of \$5,900, has been recommended by the Board of Improvements.

North Baltimore, Md.—Bids are wanted September 1st for paving South Main street with brick. Jay Radebaugh.

Toledo, O.—Bids are wanted September 3rd by the Lucas county commissioners for building stone road No. 36 and 37, by grading, macadamizing, etc. County Auditor Wm. M. Godfrey.

Indianapolis, Ind.—An ordinance has been before the Council calling for a loan of \$100,000 for the building of boulevards.

Arcola, Ill.—Bids are wanted September 5th for 7,200 yards of brick pavement on concrete. Thomas Monahan, Mayor.

Joliet, Ill.—About October 1st bids will be asked for \$50,000 worth of asphalt pavement on Bluff and Collins streets. City Engineer H. H. Stevens.

Omaha, Neb.—The paving of several streets has been ordered by the Council. Portsmouth, Va.—The finance committee of the Council submitted a report providing for the issue of paving bonds. The report was adopted.

Brooklyn, N. Y.—Engineer of Highways George W. Tillson has discovered that Coney Island and Ocean avenues are open all the way to the sea and should be public highways. The Manhattan Beach Co. has made a private road of Ocean avenue and charges toll for its use. If the engineer's contentions are upheld both of the above avenues will be laid out and improved.

Montreal, Canada.—The prices for laying pavement in this city are considered high by some of the aldermen. For mastic asphalt for sidewalks \$1.75 a yard is paid; for sheet asphalt \$3.04 with concrete and \$2.04 without, has been paid by the city.

San Francisco, Cal.—It has been estimated that the cost of paving Third street with basalt blocks and building new gutters will cost \$90,000.

Decatur, Ill.—The Council has passed an ordinance providing for the paving of West Main street at a cost of \$22,000.

South Bend, Ind.—Resolutions have been passed by the Board of Public Works for the paving with brick of Munroe and Bridge streets.

Williamsport, Pa.—Bids are wanted September 5th for paving with brick, asphalt or wooden blocks and concrete on Park and West Third streets. City Engineer F. A. Snyder.

Logan, O.—At a special election it was recently voted to issue bonds for street paving.

Dayton, O.—Bids are wanted September 5th for brick or asphalt paving on Fifth street. It is estimated that there will be 7,000 square yards of paving and 2,900 linear feet of curbing. J. E. Gumperling, President Board City Affairs.

La Salle, Ill.—It is reported that about 40,000 square yards of brick paving will be laid. City Engineer E. J. Noonan.

Loda, Ill.—It is reported that \$3,000 has been set aside for street improvement and that \$7,000 will be spent in building concrete walks.

Moline, Ill.—The Council has passed an ordinance providing for the asphalt-paving of Fifth avenue.

Omaha, Neb.—An ordinance has been considered by the Council for the paving of Twentieth, Dodge and First streets, and also Forty-sixth avenue.

Flandreau, S. D.—Bids are wanted September 3rd for building 1,500 square yards of cement sidewalks. Charles F. Pierce, Superintendent Indian School.

Little Rock, Ark.—The Board of Public Affairs will re-advertise for the asphalt-paving of West Markham street.

Beaumont, Tex.—The question of paving Park street has been considered by the Council and the county has offered \$10,000 to aid in the work.

Petaluma, Cal.—The cost of the proposed improvement on Western avenue has been placed by the city engineer at \$5,490.

Redlands, Cal.—Bids will be re-advertised for paving Orange and State streets.

South Pasadena, Cal.—Local reports state that an extensive system of street improvements will be undertaken.

Chico, Cal.—Bids are wanted September 3rd for a portable rock crusher of from five to fifteen tons capacity, with elevator and screen for same. City Clerk Richard White.

Boston, Mass.—The street commissioners have decided to purchase land for the widening of Washington street.

Chester, Mass.—A survey will be made by the State Highway Commission for extending the state highway in this place. \$5,000 has been appropriated for the work.

Waltham, Mass.—An order appropriating \$9,000 for the extending of Prince street has been authorized by the aldermen.

Brooklyn, N. Y.—Bids are wanted September 3rd for 23,750 square yards of asphalt, 4,400 square yards of granite, curbing, etc. J. E. Swanstrom, Borough President.

Buffalo, N. Y.—The cost of placing forty streets in good condition has been estimated by Commissioner of Works Ward to aggregate \$300,000.

Washington, Pa.—About 18,000 square yards of vitrified brick will be laid at a cost of \$1.50 per yard. A mile of 6-inch pipe sewers will also be laid. B. J. McAdam.

Oakland, Md.—The town has sold \$8,000 worth of bonds.

Portsmouth, Va.—Bids are wanted for furnishing 500 tons of granite paving blocks. E. B. Hawks, Secretary Local Board of Improvements of the Fifth Ward.

Chester, O.—An ordinance has been passed providing for the issue of \$20,000 worth of bonds for paving and sewers.

Toledo, O.—Bids are wanted September 8th for the improvement of Bancroft street. City Clerk Charles H. Nauts.

Evansville, Ind.—Resolutions have been adopted by the Board of Public Works for the asphalt-paving of Walnut street, First avenue and Mulberry street.

Fort Dodge, Ia.—Reports state that 8th street is to be paved with asphalt.

Moline, Ill.—It is reported that the Council will lay nine blocks of brick and thirty-nine blocks of asphalt paving.

Chariton, Ia.—It is reported that contracts will be let on September 8th for seven blocks of street paving.

Streator, Ill.—Contracts are about to be let for one mile of brick paving.

Lexington, Mo.—The subject of brick pavement has been under consideration by the Council.

Indianapolis, Ind.—The Board of Public Works has decided to asphalt two sections of 13th street and resurface with asphalt a portion of Mass avenue.

St. Clair, Mich.—\$35,000 worth of bonds were voted for the paving of Front street.

Atlantic City, N. J.—Plans have been prepared by the highway committee for the building of a boulevard 60 feet wide along Main avenue.

Boise, Idaho.—It has been proposed that a portion of 8th street be paved with brick. City Engineer Irvin.

Clarion, Pa.—Maps have been prepared by James B. Caldwell, of Brookville, for the improvement of Main street, which will consist of 7,000 cubic yards of grading; 1,700 yards of brick pavement and 6,400 linear feet of curbing.

Brooklyn, N. Y.—The borough officials have decided that the city must lay the asphalt on Third avenue, including the space between the tracks of the railway company and then sue the company for the cost.

Topeka, Kan.—The Streets and Walks Committee has indorsed Blackman's brick for the paving of East Eighth avenue.

Dayton, O.—Bids are wanted September 5th for paving Fifth street. The estimated quantities of material are 7,040 square yards of paving, 9,900 linear feet of curb. Brick or sheet asphalt will be used. Robert H. Ferguson, City Comptroller.

Alton, Ill.—City Engineer E. E. Rutledge writes that petitions have been circulated for the paving and sewerage of Bluff street from State to Main; Ridge street from Sixth to Pearl. The improvements will consist of vitrified brick and 24-inch sewer pipe.

Trenton, N. J.—On August 6th \$35,000 worth of re-paving bonds, 63,500 worth of school bonds, and \$10,000 fire engine house bonds were offered for sale by City Treasurer Stokes.

Elmira, N. Y.—Press reports in this city state that the streets are greatly in need of re-paving.

Baltimore, Md.—The Mayor is being urged to authorize the widening of Light street as a public improvement that is absolutely necessary on account of the great amount of traffic.

Montreal, Canada.—The city has decided to pave Commissioners street with granite block instead of macadam. Applications have also been made for new sidewalks amounting to \$75,000. Property owners will pay half the cost and have the choice of three kinds.

Fort Worth, Tex.—The residents of Houston street are in favor of asphalt pavement instead of brick on that street. About 9,000 linear feet of paving is to be done when the Council gives permission.

Jamaica, L. I.—The borough officials of Queens, N. Y., have been looking over the ground for the purpose of deciding what streets are to be paved with asphalt. Fulton street will probably be the first to receive this improvement.

Muncie, Ind.—The Council has decided to purchase a steam roller and to construct and improve sidewalks.

Binghamton, N. Y.—The city has decided to purchase a portable Hooke asphalt repairing plant, and \$1,000 was appropriated for the purchase of plant and supplies.

Harrisburg, Pa.—An ordinance has been adopted by the Council authorizing the paving and curbing of sixty streets, avenues and alleys with vitrified brick, asphalt block or other material. City Clerk Charles A. Miller.

Hamilton, O.—Bids are wanted September 6th for the improving of High street by paving with sheet asphalt, block asphalt, brick or other material. M. O. Burns, City Clerk.

Atlantic City, N. J.—The Board of Freeholders has decided to construct a turnpike across the meadows. This road will cost \$80,000, but \$30,000 of this will be paid by the State Road Commission and \$20,000 by the Improvement Company of Chelsea Heights.

## LIGHTING

North Adams, Mass.—The control of the plants in Adams and Williamstown has passed into the hands of the North Adams Gas and Electric Light Co. The new owners will extend the service to the neighboring towns. F. S. Richardson, Treasurer.

Dansville, N. Y.—The Mill Creek Electric Light and Power Co. will begin shortly the construction of a power plant.

Newburgh, N. Y.—The Fishkill and Matteawan Gas Co. has purchased the plants of the Fishkill and Matteawan Equitable Gas Co., and the new company will extend the mains to Glenham and Fishkill, a distance of five miles.

Ocean Grove, N. J.—The Consolidated Gas Co. has offered to supply this place with gas at \$1.60 per thousand cubic feet. Address W. L. Meeks, Ocean Grove.

Ephrata, Pa.—An electric light plant will be built by Thomas A. Willson.

Turtle Creek, Pa.—Franchises are asked by J. & A. L. Trevaskis in East Pittsburgh and Turtle Creek for power plants.

Annapolis, Md.—The state authorities will ask for bids for a central heating and lighting plant to cost \$150,000. The architects are Baldwin and Pennington, 44 South street, Baltimore.

Norfolk, Va.—Plans for a power plant of 5,000 horse power capacity have been completed by D. B. Banks, Baltimore, for H. Clay Tunis.

Atlanta, Ga.—A franchise has been asked by the Atlanta Electric Co. for a plant, electric wires and heat mains. The company wishes to build a plant on the Chattahoochee River, which, with the mains, will cost about \$1,000,000. A. H. Cox is attorney for the company.

Ocala, Fla.—An election will be held September 2nd to vote on the issue of bonds for extending the electric plant and purchasing water works.

Talladega, Ala.—The city gas plant will be sold to the Talladega Company for \$20,000. Important improvements will be made at once, including the building of an electric plant. Altogether \$500,000 is to be spent in the city. George W. Chambers, President.

Knoxville, Tenn.—The Knoxville Electric Light Co. will improve its plant, according to press reports. R. S. Williams, President, Richmond, Va.

Tuscumbia, Tenn.—J. W. Worthington was granted a franchise for an electric plant and water works and will soon begin the construction of them.

Bardwell, Ky.—The Council intends to build an electric plant at once.

Barberton, O.—A franchise for a power and light plant has been asked by the Northern Ohio Traction Company.

Manchester, O.—The question of building an electric plant and water works has been considered by S. S. Alexander and others.

Navarre, O.—A franchise for an electric light plant has been granted George A. Myers, Massillon, O.

Ladysmith, Wis.—A ten years' franchise for an electric plant has been granted to the Ladysmith Light and Power Company.

New London Junction, Wis.—This place voted to issue \$35,000 in bonds for an electric plant and water works.

Duluth, Minn.—Estimates for a city electric plant will be made by City Engineer Patton.

Jordan, Minn.—\$6,000 worth of electric light bonds were offered for sale on August 23rd. C. Roderig, City Clerk.

Helena, Mont.—The capital of the Helena Light and Construction Co. has been increased \$150,000 for the purpose of making extensive improvements. A. L. Smith, Secretary.

St. Louis, Mo.—It has been voted by the Union Electric Light and Power Co. to issue \$10,000,000 worth of 5 per cent. gold bonds, of which \$4,000,000 will be used for purchasing and improving plants. J. S. Walsh, President.

Tillsboro, Tex.—A company has been formed with a capital of \$50,000 to purchase and improve the plants at this place. M. B. Templeton is interested.

Fort Collins, Col.—A committee has been appointed to look into the matter of an electric plant and will report on the same in December. A. M. Hawley, Secretary.

Sumpter, Oregon.—A franchise for an electric light plant has been granted A. J. Stinson.

Corona, Cal.—It is reported that a movement is on foot to establish a municipal plant at this place at a cost of about \$35,000. Plans for an electric plant have been adopted by the city trustees according to a later report.

Weiser, Idaho.—This place voted to issue \$40,000 in bonds for an electric plant and water works.

Provo, Utah.—Land has been purchased by Reed, Smoot and others for the purpose of building a power plant.

Springfield, Mass.—The stockholders of the United Electric Light Co. will petition the city for permission to increase their capital stock by \$100,000. The present capital is \$600,000. The increase will be used for underground wiring and improvements in the power plant.

Duluth, Minn.—The Council has directed an estimate to be made for the building of an electric light plant. This is the first move toward acquiring a municipal electric light plant.

Omoka, Minn.—A franchise has been granted J. W. Steed for an incandescent lighting system.

Storm Lake, Iowa.—The Council has been petitioned by A. W. Unger for a franchise for a gas plant.

Fayetteville, N. C.—Bids are wanted for an electric light plant of 50 arc and 300 incandescent lights. M. B. Alexander, Lighting Committee.

Alton, Ill.—The Alton Electric Railway Co. will extend its gas mains several miles. President J. F. Porter.

Blue Ridge, Ga.—The city will construct an electric light plant to cost \$15,000.

Aberdeen, S. D.—A franchise for an electric light and power plant has been asked by Thomas Baker, Fargo, N. D.

Mercer, Pa.—James D. Emery & Co. have asked for a franchise for an electric light plant.

Lancaster, Pa.—A franchise has been granted the Lancaster Steam Heating Co. to lay a system of pipes to supply private consumers with steam.

Tiffin, O.—Franchises in Tiffin and Carey have been let to the Logan Natural Gas Co.

Minneapolis, Minn.—It is reported that the Minneapolis Electric Co. will spend \$100,000 on its plant.

Fort Wayne, Ind.—The Fort Wayne Electric Light and Power Co. has been incorporated with a capital of \$500,000. E. R. Coffin is interested.

Portsmouth, N. H.—The Exeter Manufacturing Co. will erect a lighting plant this fall.

Geneva, N. Y.—It is reported that the Steam Heating Co. will build an electric plant.

Smyrna, Del.—It is probable that bonds will soon be issued for an electric plant. H. S. Anthony, Chairman of Lighting Committee.

Hartwell, Ga.—It is reported that an election will soon be called to vote on an issue of \$30,000 in bonds for an electric light plant and water works. Mayor W. T. Johnson.

Pontiac, Mich.—This place will soon vote on an issue of \$25,000 in bonds for an electric light plant.

Charles City, Ia.—A 25-year franchise has been granted the Charles City Electric Light and Heating Co. for an electric light plant. George E. May.

Round Lake, N. Y.—The lighting of the streets of this place with electricity has been agitated.

Alton, Ill.—City Engineer E. E. Rutledge writes that the Alton Gas and Electric Railway Company will extend and increase their gas mains for several miles. J. F. Porter, President.

New York, N. Y.—The New York Edison Co. and the United Electric Light & Power Co. have agreed to reduce their present rates about 25 per cent. The present rate for electricity is 20 cents per kilowatt hour for the first two hours, but this will be reduced to 15 cents; 10 cents for the third and fourth hour; 7½ cents for the fifth and sixth hour and 5 cents thereafter.

## PUBLIC BUILDINGS

Brooklyn, N. Y.—Mayor Low has approved an ordinance calling for the issue of \$150,000 worth of bonds for an addition to the Brooklyn Institute of Arts and Sciences.

Sheboygan, Wis.—Bids are wanted September 10th for building a public library to cost \$35,000. Francis Williams, Secretary.

Cincinnati, O.—The Board of Trustees for the Public Library will sell \$180,000 worth of library bonds on September 9th.

Columbus, O.—The plans of Albert W. Ross, of New York, have been accepted for the Columbus public library.

New York, N. Y.—The Municipal Art Commission has approved the plans for the alterations to the City Hall and for three public baths.

Miami, Fla.—Bids are wanted October 7th for building a Court House. E. C. Dearborn, Clerk Circuit Court.

Bridgeton, N. J.—\$25,000 worth of bonds have been sold for a school in the Second ward.

Connersville, Ind.—A site has been purchased by the school board for a building on Houston Square to cost \$30,000.

Grand Rapids, Minn.—The plans of T. D. Orr, Minneapolis, have been accepted for a high school.

Burlington, Vt.—The plans for a \$25,000 school have been prepared by R. B. Wilcox.

Columbus, O.—The plans for the engineers' building of the State University to cost \$80,000, have been approved.

Mobile, Ala.—The plans of Architect Smith, of Montgomery, were accepted for a \$75,000 school.

Ruthven, Ia.—Bids are wanted September 3rd for a school for District No. 4. A. J. Ennis, Secretary.

South Norwalk, Conn.—The plans of S. M. Holden, Paterson, N. J., have been accepted for a \$33,000 school.

Pasadena, Cal.—The citizens have voted to issue \$100,000 in bonds for a high school.

Hartford, Conn.—\$90,000 was appropriated by the Council representatives for the purpose of building an addition and making alterations to the Hartford county court house.

Harrisburg, Pa.—Bids will be received until September 6th for the construction of a capitol for Pennsylvania. Edgar G. Helwig, Secretary.

Scranton, Pa.—Bids will be received by the city of Scranton on a new fire and police station three stories high, to cost \$40,000. F. L. Brown, architect. The Scranton Board of Control contemplates a manual training school in this city. E. D. Fellows, Secretary.

Pikesville, Md.—Plans for a two-story brick and stone armory for Troop A have been prepared by Wyatt & Notting, Baltimore. The building is to cost \$50,000.

Toledo, O.—Bids were asked until September 1st for a four room addition to the Monroe street school. Clerk of the Board of Education.

La Salle, Ill.—Plans will be received by the Board of Education up to September 1st for the erection of a new school building. Address Thomas N. Haskins, La Salle.

Sheboygan, Wis.—Bids will be received until September 8th for the erection of a library building to cost \$35,000. A. W. Pott, President Board Library Directors.

Houston, Tex.—Plans and specifications are wanted until October 6th for the building of a market house and city hall on Market Square, not to exceed \$100,000. O. T. Holt, Mayor.



Hackensack, N. J.—The Hackensack Improvement Commission has been considering the question of erecting a municipal building, and it is probable that this building will be constructed.

Yorkton, N. W. T.—Bids are being asked for the construction of a new court house. Plans may be obtained from Frederick Gelinis, Secretary Public Works, Ottawa, and bids are to be sent to him also.

Jersey City, N. J.—The plans for school No. 11 have been approved and the school will be completed this fall if possible.

Englewood, N. J.—The Board of Education has decided to erect a new school house to cost about \$4,000. Mayor Allison.

San Antonio, Tex.—The Board of School Trustees desires plans for a new school to be located in the East End. Charles Florian, Chairman.

Traverse City, Mich.—The Hon. Perry Hannah has offered a site for the proposed Carnegie library building.

Pasadena, Cal.—A recent bond election to decide the question of issuing \$10,000 worth of bonds for the new high school was carried, and steps will be taken at once to complete the project.

Lawrence, Kans.—The city has been offered \$25,000 by Carnegie for a public library.

Rochester, N. Y.—Public sentiment in this city is growing for the installation of a new contagious disease hospital, and the city officials may soon take action looking toward its erection.

Houston, Tex.—The City Council has passed a resolution calling for the issue of bonds to the amount of \$200,000 for the building of a new city hall and market house.

Pittsburgh, Pa.—Plans for a new municipal hospital are being prepared by architect Sidney T. Heckert, and bids will soon be asked for its erection. It is estimated that it will cost \$80,000, and room will be provided for about one hundred patients.

Montreal, Canada.—The city has accepted the offer of Andrew Carnegie for a public library to cost \$150,000.

Bay St. Louis, Miss.—The city has been contemplating the erection of a city hall to cost \$3,000. Address the Mayor for particulars.

Worcester, Mass.—The committee on Finance of the Council recommended a loan of \$100,000 to pay for the erection of a new police headquarters on Waldo street.

Akron, O.—The city hall, which was burned by the rioters, will be replaced by a new building to cost \$150,000.

Hoboken, N. J.—The Board of Education of Fairview ordered the sale of bonds for the purpose of building a new school.

Orange, N. J.—Orange is to have a new city hall, the site for it having been purchased for the sum of \$40,000. Mayor Stetson.

Louisville, Ky.—Specifications will be advertised for a new county jail to contain three hundred cells, and to cost about \$125,000. The Fiscal Court has the matter in charge.

Lincoln, Ill.—The supervisors will take a vote at the fall election on the question of erecting a new court house, to cost about \$150,000.

Baldwinsville, N. Y.—The Board of Supervisors recently voted to build a new court house on the Carnegie library site.

Oneida, N. Y.—Bids for the new \$32,000 high school on Main street were rejected by the Board of Education, and new bids are to be called for.

Washington, D. C.—Before the close of the session, the Senate passed a bill appropriating \$2,500,000 for a building for the Department of Agriculture.

Windsor, Conn.—The city has been presented with a brick and granite library, to cost \$15,000, by B. F. Blood, of Waltham, Mass.

London, Ohio.—The plans of Werner & Adkins, of Cincinnati, O., were accepted for the Carnegie library, to cost \$50,000.

St. John, Neb.—When the plans are received for the erection of a \$50,000 public library bids will be asked for its construction. Clerk H. E. Wardroper.

Bremen, Tex.—The City Council has adopted plans for a new city hall.

## WATER WORKS

Lecompte, La.—The village has voted to install water works at a cost of \$8,000. The Consulting Engineer is Ira W. Sylvester, Alexandria, La.

Charleston, W. Va.—Plans have been prepared for the municipal ownership of the water works. The estimated cost is from \$175,000 to \$250,000. A. D. Mead, Councilman.

Wilmot, Minn.—The bids for the construction of water works that were opened in August have been rejected. M. B. Haines, Mankato, is the engineer in charge.

Lidgerwood, N. D.—The proposed water works, which are to cost \$8,000, will be in charge of J. J. Flather, University of Minnesota, Minneapolis.

Abingdon, Ill.—It is reported that water mains to cost \$2,800 will be laid. George C. Morgan, Chicago, Engineer.

Chester, Ill.—A franchise has been granted by the Council to the Chester Light, Water & Ice Co. for the laying of water mains.

Sault Ste. Marie, Mich.—Bonds in the sum of \$125,000 have been sold for water purposes; \$4,000 for sewers; \$25,000 for streets.

New Britain, Pa.—Steps for the building of a municipal water works have been taken by the Citizens' Improvement Association.

Toledo, O.—The Water Works Board has returned from a visit to the sand filtration plants of other cities and hopes to install a similar plant here.

Vernal, Utah.—The Ashley Valley Irrigation and Reservoir Co. has been incorporated with a capital of \$150,000.

Denver, Col.—The water company has decided to lay about three miles of mains.

Schulenburg, Tex.—An issue of \$11,000 in bonds for water works has been approved.

Brockton, Mass.—The water committee has asked for a loan of \$300,000 for a new pumping station, intakes, mains, etc. Supt. Kingman, of the Water Works.

Fairview, Mass.—The Chicopee aldermen have been considering the question of obtaining a new water supply for the place and Willimansett to cost about \$35,000. Alderman Rivers, Chairman of Committee.

Milford, Mass.—If the town votes to buy the water works, improvements will be made.

Peabody, Mass.—Plans for the new water works have been completed by Snow & Barbour, of Boston. It is proposed to build a 3,000,000 gallon reservoir.

Carthage, N. Y.—At a recent election a proposition to issue \$170,000 in bonds for water works was defeated.

Ossining, N. Y.—It is reported that Henry B. Valentine, Civil Engineer, is desirous of obtaining estimates from manufacturers of wind mills and stand-pipes.

Yonkers, N. Y.—The question of securing an increased water supply to cost \$50,000 has been considered by the water commissioners.

Vailsburg, N. J.—The question of buying works of the Essex-Union Water Co. has been considered. If the borough does not buy it is probable that new works will be erected. Alderman Welscher.

Edgewood, Pa.—The Rostiaves Water Company has been incorporated with a capital of \$10,000. G. H. Craig, of Allegheny, Pa., and M. R. Haymaker, of Edgewood.

McKee's Rocks, Pa.—At the election in February next this place will vote on the question of issuing \$75,000 in bonds for new works.

Narberth, Pa.—The Council is considering the question of works and electric plant.

Mount Lake Park, Md.—It is proposed by the Mount Lake Water and Light Co. to procure a new gravity water supply and build a 2,000,000 gallon reservoir. W. E. London, Manager.

Welden, N. C.—The construction of works and of a sewerage system has been considered.

Georgetown, S. C.—This place has voted to issue \$75,000 in bonds for water works and a sewerage system. J. L. Ludlow, Engineer, Winslow, N. C.

Blue Ridge, Ga.—Estimates for water works and a sewerage system are asked by John H. Carter.

Columbus, Ga.—It was reported that this place was soon to vote on bonds for a new water works or buy the works of the Columbus Water Works Co.

Hartwell, Ga.—The question of water works and electric plant to cost \$25,000 has been considered. W. T. Johnson, Mayor.

Ocala, Fla.—This place will vote September 2nd on an issue of bonds for water works and electric light plant.

Bessemer, Ala.—A new contract to furnish the city with a water supply has been asked by Morris Adler, of Birmingham, Ala.

Baton Rouge, La.—Freeman C. Coffin, Boston, Mass., has been engaged as an engineer to examine the works of the Baton Rouge Water Co., which the town may purchase. City Surveyor Swarts.

Meridian, Miss.—\$150,000 in bonds has been voted by this place for water works. The engineers are Kirkpatrick and Johnson, Jackson, Miss.

Union City, Tenn.—The question of extending the works and the electric plant is under consideration.

Bellaire, O.—The question of putting in water meters has been under consideration.

Bowling Green, O.—The City Water Company has been incorporated with a capital of \$100,000, by Myron L. Chase and another.

Brookville, O.—This town was soon to vote on the question of issuing \$24,000 in bonds for water works.

East Liverpool, O.—The question of the building of a filtration plant to cost about \$50,000 has been under consideration by the Board of Trustees.

Portsmouth, O.—On September 2nd bids will be received for an intake crib by Sturtevant & Todd, consulting engineers, Fisher Building, Chicago, Ill.

Toledo, O.—The Water Board asked bids for 4400 tons of water pipe recently. The question of building a filter plant on Corbutt Island to cost \$200,000 has been under consideration. T. R. Cook, Superintendent of Water Works.

Wyandotte, Mich.—It has been decided by the Board of Works that water meters must be installed and that works, electric plant and sewerage system improved.

Macomb, Ill.—The question of installing a new water supply is under consideration.

Springfield, Ill.—Plans have been prepared for a new dam by City Engineer F. H. Hamilton. An additional water supply will be considered later.

Wonevot, Wis.—It has been voted to build water works to cost \$10,000.

Fort Madison, Ia.—This place will vote on September 4th on the question of a new franchise for a water supply with the Fort Madison Water Co.

Madrid, Ia.—The question of building water works is under consideration. Mayor Garwood.

Welman, Ia.—The question of improving the water works has been considered.

Minneapolis, Minn.—The Council has directed that \$250,000 worth of bonds be sold for the purpose of improving the works.

Monticello, Minn.—It was voted to spend \$10,000 in bonds for works and \$4,000 for a gas plant.

Wausa, Neb.—This place will soon vote on the question of issuing bonds for works. A. E. Syngg.

Chinook, Mont.—It is reported that this place voted to issue \$24,000 in bonds for works.

Farmington, Mo.—Bids will be received September 4th for building water works. George M. Wilson, Mayor.

Kansas City, Mo.—Bids are wanted September 1st for a 15,000,000 gallon pumping station. Baxter Brown, Secretary Public Works.

San Antonio, Tex.—The San Antonio Water Company will extend its works sinking new artesian wells and installing two pumps, one of ten and one of fifteen million gallon capacity, at a total cost of \$227,000. President George W. Brackenridge.

Terrell, Tex.—It is reported that the city will need two 100-h. p. boilers and a supply of four-inch pipe for a new water supply from artesian wells. J. A. Coffee is the engineer.

Uvalda, Tex.—The Kelley-Rose Irrigation Co. has been incorporated with a capital of \$50,000 by A. A. Kelley and another for the purpose of building a ten mile irrigation system.

Waco, Tex.—Bids will soon be asked by the Council for plans for the proposed water works to cost \$400,000. City Engineer G. B. Gurley.

Aberdeen, Wash.—Bonds in the sum of \$100,000 have been voted for the purpose of building works. W. W. Austin.

Ballard, Wash.—The proposed extension of the works will include 12,000 feet of 4, 6 and 8-inch wooden stave pipe, twenty-two hydrants, eight gate valves, etc., etc., to cost \$10,000. Acting City Engineer O. M. Rankin.

Pullman, Wash.—Bonds for the purpose of extending the works have been voted at this place.

Los Angeles, Cal.—Bids will be received September 8th for 7,000 pieces of 4 to 36-inch c. i. water pipe and about 600 tons of castings. William Mulholland, Superintendent Public Works.

Sebastopol, Cal.—The question of building works has been considered by local parties.

Woodland, Cal.—A syndicate has been formed for the purpose of irrigating 300,000 acres of land at a cost of \$3,500,000. W. F. Ford, San Francisco.

Yreka, Cal.—Bonds for the purpose of building works were offered for sale in August. City Clerk N. F. Brown.

Payson, Utah.—It is reported that this place was soon to vote on the question of building works.

Richfield, Utah. It is reported that an engineer will soon be engaged to prepare plans for water works.

Weiser, Idaho.—This place voted to issue \$40,000 in bonds for water works and electric plant.

Brandon, Manitoba.—The Council voted to move the pumping station, to install two 1,000,000-gallon pumps, a stand-pipe, new intakes, etc. City Engineer W. H. Shillingars.

Narberth, Pa.—The citizens of this town have appointed a committee to inquire into the cost of municipal water works and an electric light plant. The establishment of a water plant is necessary from the fact that the Springfield Water Company is unable to furnish sufficient pressure for the fire hydrants.

Columbus, Ga.—The city water supply is reported as being unfit for drinking purposes, and the question of an additional water supply is a serious one. A resolution has already been passed by the City Council instructing the preparation of an ordinance ordering an election for bonds for new water works.

Pittsburgh, Pa.—A prominent engineer has stated that the first thing for the city of Pittsburgh to do is to provide meters for its water system before any attempt is made to increase the supply. If the waste of water is eliminated the consumption may be so reduced that the building of additional reservoirs may be postponed for some time.

Sacramento, Cal.—J. C. Pierson, city surveyor, has made a careful investigation of the water question in this city and says that the present conditions demand that new water mains be laid so that there shall be an equal distribution of the water throughout the city.

Coopersburg, Pa.—The borough has voted to issue \$19,000 in bonds for municipal water works.

Campbellsville, Ky.—The City Council has been receiving bids for water works and electric light plant.

Pennsgrove, N. J.—Plans and specifications for water works and an electric light plant have been approved by the Council. \$35,000 in bonds were recently voted for this purpose.

Whitesboro, Tex.—The city wishes to grant a franchise for water works. N. T. Callright, City Secretary.

St. Louis, Mo.—The Malvern Water & Improvement Co. has been incorporated for the purpose of operating water, sewer and lighting systems. Charles W. Smith is an incorporator.

Quanah, Tex.—The issue of \$8,000 in water bonds has been approved by the Attorney General.

Tabor, Ia.—This place voted to issue \$6,000 worth of bonds for water works. Conrad, Ia.—Press reports state that water works are to be built here.

Philadelphia, Pa.—Bids for the building of the fire main pumping station at the foot of Race street will soon be asked.

Orillia, Ontario.—It was recently voted to issue \$18,000 in bonds for water works improvements and \$30,000 for an electric light plant. Town Treasurer C. E. Grant.

Washington, D. C.—The bids that were received in August for a filtration plant for the water works have been postponed until further notice.

Bridgeport, Conn.—The aldermen have been discussing the matter of filtration of the water company's supply, and some desire to compel the company to put in filters at once. Much complaint has arisen concerning the condition of the water supply in the city.

Atlanta, Ga.—The Water Board will request the City Council to provide the sum of \$50,000 for filters, which are badly needed.

Birmingham, Ala.—The Birmingham Water Co. will use the mechanical process for filtering its water. The plant will consist of forty large tanks fifteen feet in diameter and twelve feet high. Two will be erected at North Birmingham and the combined capacity of the forty tanks will be 20,000,000 gallons.

Hawkesbury, Ontario.—An ordinance to raise \$100,000 to install a modern and expensive system of water works was passed by a large majority at a recent election. W. H. Lawlor, Town Clerk.

Montreal, Canada.—The boiler inspector recently notified the water committee to purchase three new boilers for the low level water works station. Those in use are worn out and it is dangerous to use them any more.

## SEWERAGE

Peekskill, N. Y.—It is reported that \$51,280 worth of sewer bonds were sold.

Durango, Col.—The estimated cost of a sewerage system has been placed at \$70,000.

Bradley Beach, N. J.—A franchise for the construction of a sewer system has been asked by T. Frank Appleby, of Asbury Park.

Guthrie, O. T.—Ordinances have been passed by the City Council for two main sewers and laterals.

Denver, Col.—An ordinance has been passed authorizing the building of a sanitary sewer in district No. 3 at a cost of \$16,800.

South Bend, Ind.—It has been decided to reclaim the Kankakee Marsh by the construction of a drainage canal 17 miles long to cost \$85,000.

Mission Valley, Ia.—Harrison and other counties have decided to build a system of canals to drain 100,000 acres of land.

Bellville, Ill.—An ordinance has been passed by the Council for the building of a brick sewer 30 and 26 inches in diameter. City Engineer Lewis Graner.

Atlantic, Ia.—The Iowa Engineering Co. has been preparing plans for a sewerage system to be built next year.

Lakewood, O.—Bids are wanted September 6th for sewer and water mains in Lake avenue. Bids are also wanted for sewers on Clifton Boulevard. John French, Hamlet Clerk.

Port Huron, Mich.—The Council has been considering the issue of \$60,000 worth of sewer bonds.

Revillo, S. D.—Surveys have been completed for a system of sewers.

Ogdensburg, N. Y.—It has been voted by the Common Council to build a sewer in Barre street.

Boise, Idaho.—2,190 feet of 6-inch pipe sewers will be laid. City Engineer C. H. Irvin.

Oakland, Cal.—Plans have been prepared by the county surveyor for the building of a sewer in San Leandro Road to cost \$17,000.

Sanford, Me.—It has been voted to build the Cottage street sewer at a cost of \$25,000. W. M. Chase, Berwick, is the engineer.

Athol, Mass.—Bids are wanted September 3rd for building about five miles of sewers. Sewer Commissioners.

Plymouth, Mass.—The committee on sewerage of the town has reported that the proposed sewers can be built for \$18,000.

Bristol, R. I.—It was voted to borrow \$10,000 for the purpose of constructing sewers.

Essex, Conn.—The question of a sewerage system for this place has been agitated.

Milford, Conn.—It is reported that a sewerage system to cost \$30,000 has been installed.

Babylon, N. Y.—The local board of health has been considering the sewerage question, and it is probable that some action will be taken soon.

Castile, N. Y.—Plans for the proposed sewerage system are soon to be submitted to the State Board of Health. J. H. Chapman, Village President.

Oneida, N. Y.—The city engineer has been preparing plans and specifications for the McGuire street trunk sewer.

Plainfield, N. J.—Bids are wanted September 2nd for about 25,800 feet of 8-inch sewer, including 1,000 branches on 8-inch sewers; 5,650 feet 4-inch house connections, manholes, flush-tanks, etc. City Surveyor Gavett.

New Albany, Ind.—At the meeting of the Council held in August for the purpose of discussing sewer construction, matters were deferred for a month or two. City Engineer Sam. T. Mann.

Aberdeen, Wash.—\$20,000 in bonds was voted for the purpose of getting a sewer system. E. J. Hunt, City Engineer.

Kansas City, Mo.—Contracts will soon be let for 13,500 feet of pipe and 2,000 feet of brick sewers in sewer district No. 208. There will be 55 manholes, 45 catch basins and 7 flush tanks, the whole to cost \$30,000. Sewer district 221 will have 18,000 feet of pipe, 3,500 feet of brick sewers, 69 manholes, 62 catch basins and 7 flush tanks, to cost \$36,000. City Engineer R. W. Waddell.

Santa Rosa, Cal.—It is reported that the sewer system is to be extended at a cost of \$4,000. J. W. Keegan, Sewer Committee.

Fort Dodge, Ia.—Bids are wanted for the construction of an 18-inch storm water sewer.

Trenton, N. J.—The health board has decided to either ask for a new incinerating plant or compel all persons to use the sewer connections.

Hawkesbury, Ontario.—An ordinance has been passed authorizing the expenditure of \$53,000 on a modern sewage system. Town Clerk H. W. Lawlor.

Fairview, N. J.—The long discussed question of the sewer system is nearing conclusion, and it is probable that before long some definite action will be taken by the Council in favor of the project.

Fort Worth, Tex.—If the proposed plan is accepted the South Side is to have a sewer system. As the city is unable to bear the entire burden the property owners must advance the money, which will amount to about \$30,000. Of the